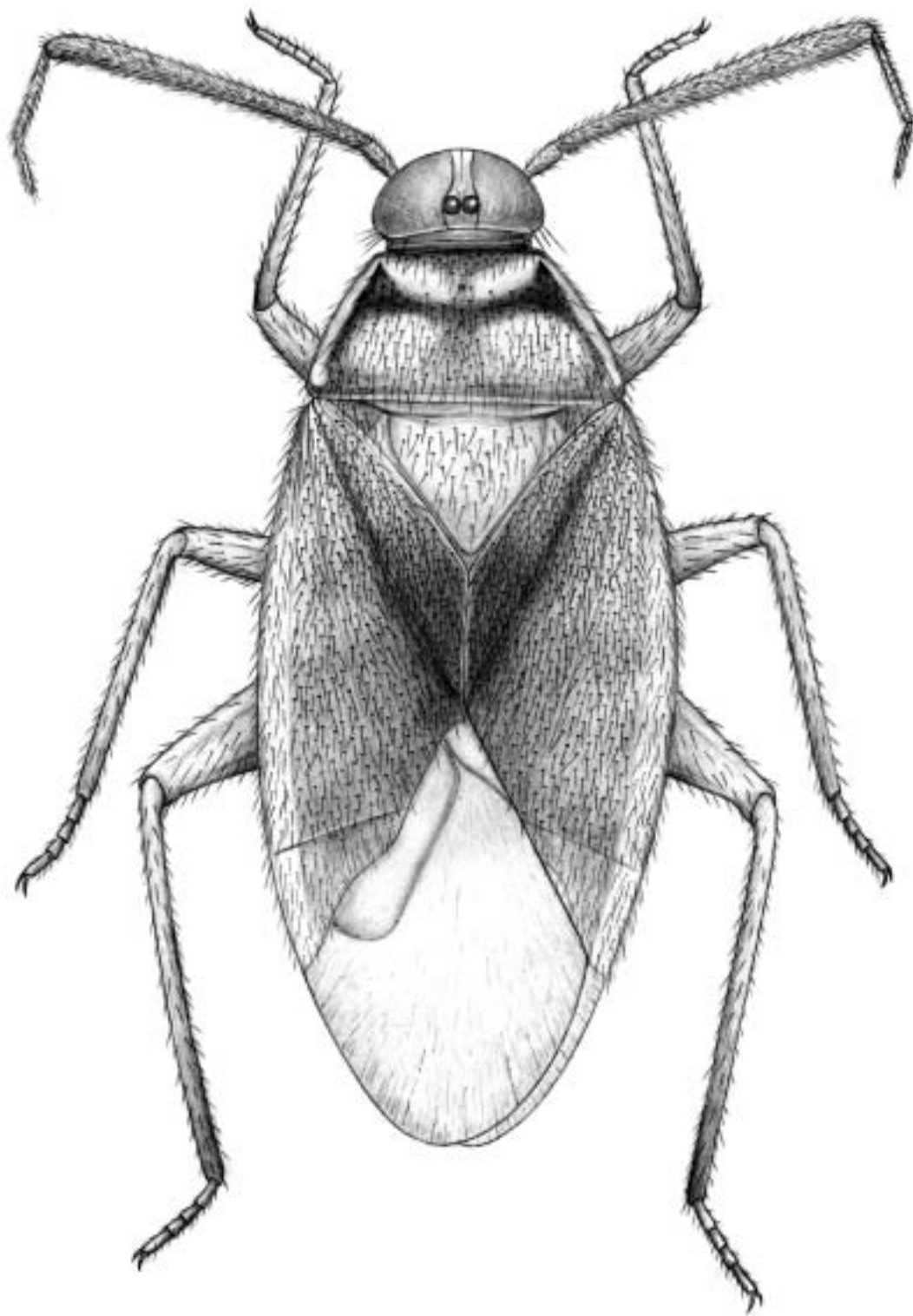


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Isometopidea yangi Lin, 2005

External Male Genitalia of the Miridae (Hemiptera: Heteroptera)

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ABSTRACT

The external male genitalia of 121 species in 20 tribes of eight subfamilies in the Miridae were examined (except for *Diphleps unica* Bergroth which was cited from Konstantinov, 2003). Some structures were rejudged or given a new interpretation, i.e., Singh-Pruthi's bulbous vesica was rejudged as being the exposed ejaculatory conjunctiva; Singh-Pruthi's ejaculatory duct within the bulbous vesica was rejudged as being the actual aedeagus; Singh-Pruthi's endosoma undifferentiated into the conjunctiva and vesica was interpreted as being a wholly reduced aedeagus. The support bridge, support tube, and phallobasal conjunctival processes exposed in the genital chamber were distinguished. The expanded ejaculatory duct between the apex of the support tube and the base of the aedeagus were judged to be independent modifications, not homologous structures of the ejaculatory reservoir in the Pentatomomorpha. The following phylogenetic relationships in the Miridae are proposed: (Isometopinae + (Psallopinae + Cylapinae)) + ((Orthotylinae + Phylinae) + (Bryocorinae + (Deraeocorinae + Mirinae))).

Key words: Miridae, external male genitalia, phylogenetic relationships.

盲蝽科之雄性外性器（半翅目：異翅亞目）

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本文共檢查盲蝽科中八亞科，二十族，一百二十一種雄性外性器，其中僅 *Diphleps unica* Bergroth 引用自 Konstantinov, 2003 文獻。文中將以前作者之泡囊狀陽莖端（bulbous vesica）判定為外露系膜（exposed phallobasal conjunctiva）。辛氏的（Singh-Pruthi's）內陽莖（endosoma）未分化為系膜（conjunctiva）與陽莖端（vesica）解釋為陽莖（aedeagus）完全退化。另區別出支架橋（support bridge），支架管（support tube），外露於生殖腔（genital chamber）之陽莖鞘系膜突起（phallobasal conjunctival processes exposing in genital chamber）。位於支架管端部與陽莖基部間之膨大的射精管（ejaculatory duct）認定為獨立的改變，其與蝽次目中之精泵（ejaculatory reservoir）非為同源。盲蝽科之類緣關係推定為：(Isometopinae+ (Psallopinae+ Cylapinae))+ ((Orthotyline+ Phylinae)+ (Bryocorinae+ (Deraeocorinae+ Mirinae)))。

關鍵詞：盲蝽科，雄性外生殖器，類緣關係。

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INTRODUCTION

Singh-Pruthi (1925: 176) remarked for the Capsidae (= Miridae), "The endosoma is differentiated into conjunctiva and vesica, except in the sub-families Bryocorinae and Dicyphinae, but this differentiation is entirely different from that in Pentatomidae, Lygaeidae, etc. where the vesica is a narrow, stiff, cylindrical organ, while in Capsidae it is bulbous, produced into diverticula..." Singh-Pruthi's above view was followed by Kelton (1959) and Konstantinov (2003).

There are two points which are difficult to understand. First, if the bulbous vesica evolved from a stiff one, then an intermediate stage probably existed. Singh-Pruthi did not mention this. In Kelton's (1959) and Konstantinov's (2003) papers, there is no evidence either. Then what happened? This certainly is a key point to understanding the external male genitalia of the Miridae. This evolutionary event occurred only in the Miridae, among the Heteroptera, as far as is known. Second, the endosoma is undifferentiated into the conjunctiva and vesica in the subfamilies Bryocorinae and Dicyphinae. The aedeagus (vesica *sensu* Singh-Pruthi, 1925, Kelton, 1959, and Konstantinov, 2003) is differentiated in the Aphidoidea, Coccoidea, Aleyrodoidea, Psylloidea, Cercopoidea, and Cicadoidea. The view that the vesica is undifferentiated in the Bryocorinae and Dicyphinae seems to be an unreasonable hypothesis unless one accepts Singh-Pruthi's view, that the Heteroptera is the most-basal taxon of the Hemiptera (Singh-Pruthi, 1925: 237, fig. 2).

Again, Dupuis and Carvalho (1970: 198) considered the ejaculatory reservoir to be present in the Miridae. Tsai et al. (2004) in redefining the ejaculatory reservoir *sensu stricto* in the Pentatomomorpha judged this structure to be present only in the Pentatomomorpha, but they did not provide evidence that the structure in that Miridae was not homologous to the structure in the Pentatomomorpha. That is why a thorough examination of all species in the Miridae is urgently needed.

The support bridge and support tube were not distinguished by Singh-Pruthi (1925), Kelton (1959), or Konstantinov (2003).

In this paper, we attempt to obtain different results based on a revised interpretation of the external male genitalia.

MATERIALS AND METHODS

This study was based on the examination of 120 species in 20 tribes of 8 subfamilies, and on data for *Diphleps unica* Bergroth (Isometopinae: Diphlebini) cited from Fig. 49 of Konstantinov's (2003) paper. All specimens are deposited in the National Museum of Natural Science, Taichung, Taiwan.

Specimens were dried with the abdomen separated from the body and then heated in 10% liquid sodium hydroxide. After the structure became soft and transparent and could easily and clearly be seen, it was transferred directly into glycerin. It was fixed onto a cavity slide glass using cotton fibers. Abdominal segment IX was separated from the remainder by insect pins. Abdominal segment IX including the genital styles was drawn in dorsal, left lateral, and caudal views using a microscope drawing tube. After completing the drawing, abdominal segment IX was carefully dissected, and the ligamentary processes between the genital plates and dorsal arms of the connective were excised. Then the phallus was drawn in dorsal and left lateral views. Finally the exposed ejaculatory conjunctiva was everted to examine the ejaculatory conjunctiva, aedeagus, and ejaculatory conjunctival processes exposed in the genital chamber. Further dissection was carried out if needed. Chlorazol black E (0.5% in 50% alcohol; Mega-view Science Education Services, Taichung, Taiwan) was used for staining if necessary.

Schuh and Slater's (1996) system of the Miridae was followed, and subfamilies and tribes were confirmed, but genera were neglected. As for inferences concerning, cladistic rules did not strictly observe. As for the phylogenetic relationships, we attempted to use each individual species as a taxon unit. Each illustration of the external male genitalia is published herein, because we believe that it will be useful for alpha-taxonomists of the Miridae.

Re-judgments and New Interpretations of Structures

Main differences between Singh-Pruthi's (1925) and Yang and Chang's (2000) view of the external male genitalia in the Hemiptera (Diag. 1)

Singh-Pruthi (1925) considered that the aedeagus could be differentiated by the unequal chitinization into the phallosoma and endosoma,

which was further differentiated into the conjunctiva and vesica.

Yang and Chang (2000) considered the aedeagus to be an independent structure and Singh-Pruthi's periandrium to be an evolutionary event independent of the aedeagus. Singh-Pruthi's periandrium was judged to be a combination of the phallobase, phallobasal conjunctiva, and connective.

This is the main reason why the terms used in this investigation differ from those of previous authors.

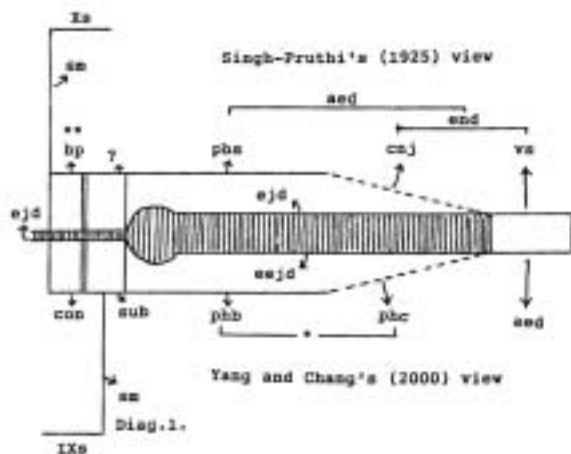


Diagram 1. Main differences between Singh-Pruthi's, and Yang and Chang's view of the external male genitalia.

* An evolutionary event independent of the aedeagus.

** The support bridge was not distinguished by Singh-Pruthi.

The connective (basal plates *sensu* Singh-Pruthi) was judged to "lie in the lateral borders of the basal foramen (Heteroptera) or lying on the segmental membrane inside the body cavity (Homoptera), separate the two suborders quite distinctly without any exception." (Singh-Pruthi, 1925: 236).

Abbreviations: Aed, aedeagus; bp, basal plates; cnj, conjunctiva; eejd, expanded ejaculatory duct; ejd, ejaculatory duct; end, endosoma; phb, phallobase; phs, phallosoma; sm, segmental membrane; sub, support bridge; vs, vesica; vs, vesica; IXs, abdominal sternite IX; vs, vesica; Xs, abdominal sternite X.

Aedeagus

Comparing Diags. 2 and 3, the A-structures have the same the position and function, and are of the same tribe (Isometopini). According to Singh-Pruthi's interpretation the A-structure in Diag. 2 is the vesica and in Diag. 3 is the ejaculatory duct. If this is correct, then why does the ejaculatory duct entering into vesica become solid and not spiral (Diag. 3). Singh-Pruthi (1925: 142) described in

Coptosoma cribrarium (Pentatomomoidea: Plataspidae) that the "vesica fused throughout with the ejaculatory duct within". This is a reasonable interpretation of above case. So the A-structure in Diag. 3 is the aedeagus (vesica *sensu* Singh-Pruthi).

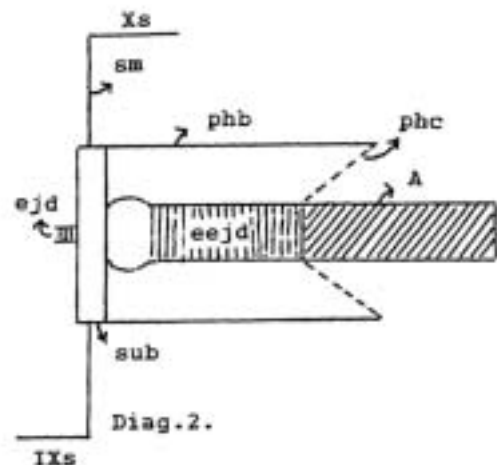


Diagram.2. Based on *Sophianus formosanus* Lin and Yang

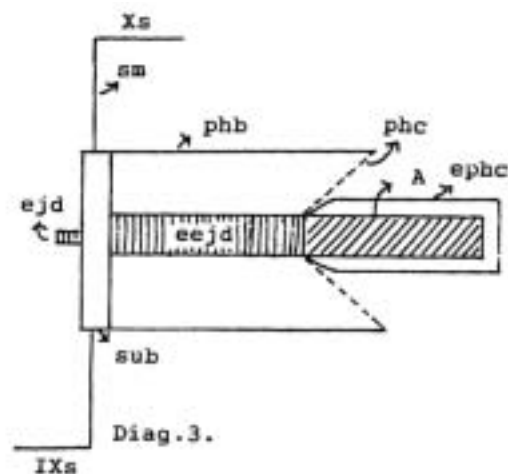


Diagram.3. Based on *Isometopus hasegawai* Miyamoto

Exposed phallobasal conjunctiva

Singh-Pruthi (1925: 171) described in *Calocoris norvigicus* (Miridae) "Vesica quite different from that in any the previous families, large and narrow proximally, wide and very much expanded in the distal region where it is produced into four diverticula (vs. du), three of which become subsequently solidified; free from the ejaculatory duct within, which is thick and conspicuous, but shorter than the vesica, so that the gonopore lies about the middle on the dorsal surface instead of at the apex."

Yang and Chang (2000: 658, fig. 534) judged

that Singh-Pruthi's vesica being called the theca was wrong. Here we re-judged that this structure is the exposed phallobasal conjunctiva (Diag. 4). The theca is present in the Fulgoroidea (Eurybrachidae, Lophopidae, Ricaniidae, Tropiduchidae, Flatidae, Nogodinidae, Issidae, and Acanaloniidae). The exposed phallobasal conjunctiva is present in the Fulgoroidea (Cixiidae and Derbidae) and Heteroptera (a portion of the Miridae). Both the theca and the exposed phallobasal conjunctiva are bulbous growths of the phallobasal conjunctiva around the base of the aedeagus, but in a reposed condition, the former is situated within the phallobasal cavity and the latter is at least partly exposed in the genital chamber.

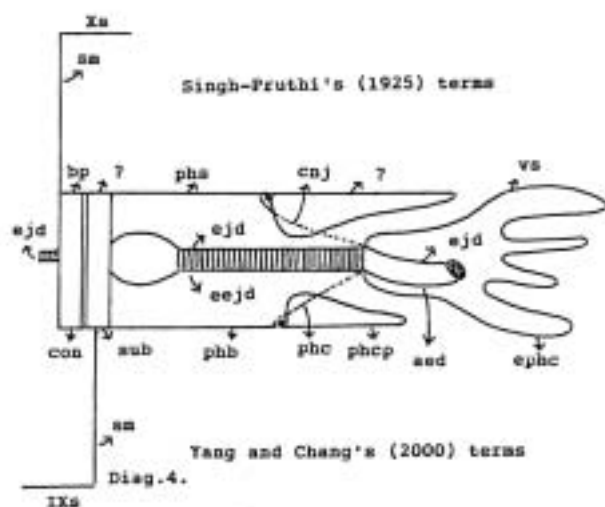


Diagram 4. Based on *Calocoris norvegicus*

Abbreviations: Aed, aedeagus; bp, basal plates; cnj, conjunctiva; con, connective; eejd, expanded ejaculatory duct; ejd, ejaculatory duct; ephc, exposed phallobasal conjunctiva; phb, phallobase; phc, phallobasal conjunctiva; phcp, phallobasal conjunctival processes; phs, phallosoma; sm, segmental membrane; sub, support bridge; vs, vesica; IXs, abdominal sternite IX; Xs, abdominal sternite X.

Ejaculatory conjunctival processes exposed in genital chamber

Singh-Pruthi (1925: 171) described in *Calocoris norvegicus* (Miridae) "Conjunctiva smooth, without any appendages, the proximal region permanently fused to the inside of the phallosoma, so that even in the condition of complete eversion it being not wholly exposed." In a normal condition, the conjunctiva has to connect the apex of the phallosoma and the base of the vesica. It is impossible for the conjunctiva to be

"fused to the inside of the phallosoma". Unfortunately Singh-Pruthi provided no explanation.

Our observations are as follows. In *Mecistoscelis scirtetoides* Reuter (Mirinae: Mecistoscelini) (Diag. 5), the A-structure is rod-like in lateral view, and its base is connected to the apex of the phallobase by a membranous area. The A- and B-structures are situated oppositely on the dorsal and ventral apices of the phallobase.

In *Charagochilus taivanus* (Poppius) (Mirinae: Mirini) (Diag. 6), the A-structure is half as high as the apex of the phallobase, and the mid-basal portion of the longitudinal mid-dorsal arched plate is connected with the apex of the phallobase by a membranous area.

In *Orthops scutellatus* Uhler (Mirinae: Mirini) (Diag. 7) the A-structure is nearly as high as the apex of the phallobase, and the mid-basal portion of the longitudinal mid-dorsal arched plate is connected with the apex of the phallobase by a membranous area.

In *Orthotylus* sp. 2 (Orthotylinae: Orthotylini) (Diag. 8), the upper structure was judged to be the sclerotized dorsal portion of the phallobase united with the A-structure, because the phallobasal conjunctiva connects to this upper structure at its mid-ventral aspect. The B-structure is large, and its mid-ventral portion is connected with the apex of the phallobase by a membranous area.

In *Excentricus planicornis* (Herrich-Schaeffer) (Orthotylinae: Orthotylini) (Diag. 9) the B-structure is extremely developed, its base is as high as the apex of the phallobase, and the longitudinal mid-ventral is an arched plate. Its mid-ventral portion is connected with the apex of the phallobase by a membranous area. In *Mecomma capitata* Liu et Zheng (Orthotylinae: Orthotylini) (Diag. 10), the B-structure is tube-shaped, as high as the apex of the phallobase, and its mid-ventral portion is connected with the apex of the phallobase by a membranous area. Based on the above data, the A- and B-structures were judged to be independent structures and not a part of the phallobase. This judgment was based on the following reasons: the phallobasal conjunctiva is connected before their bases; and the mid-dorsal or mid-ventral portion are connected with the phallobase by a membranous area.

If this judgment is correct, then what are those structures? Considering their position between the apex of the phallobase and the base of the aedeagus, the phallobasal conjunctival processes

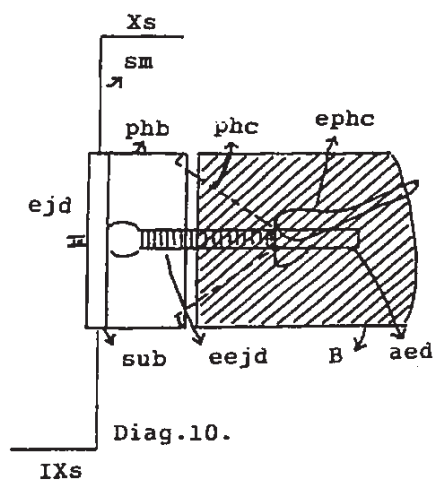
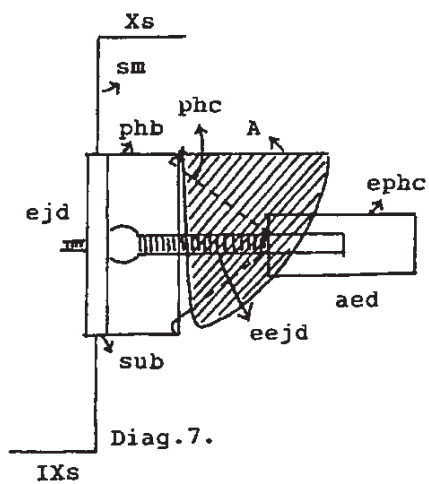
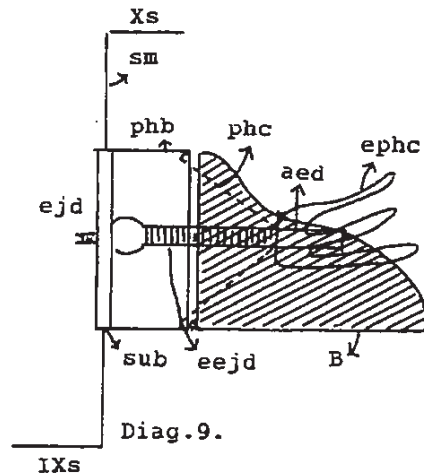
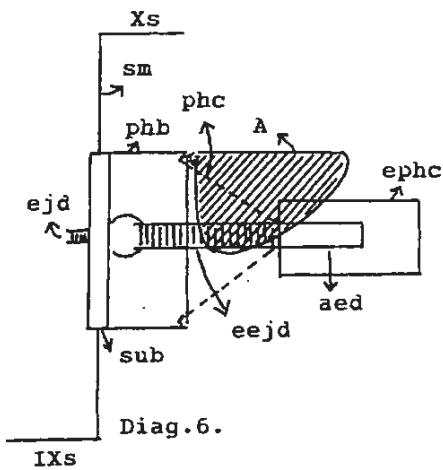
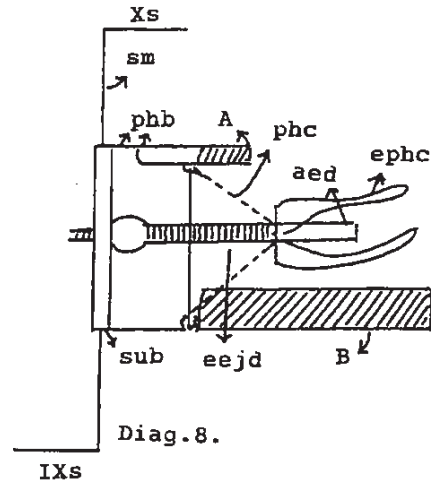
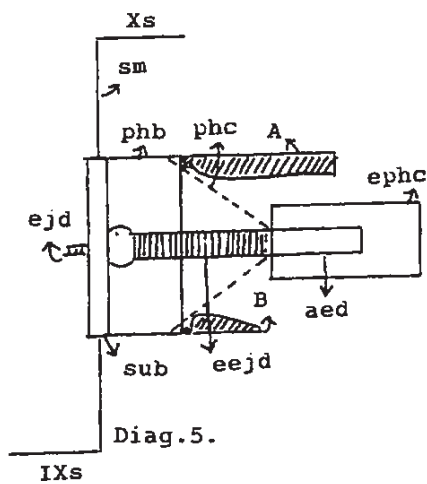


Diagram 5. Based on *Mecistoscels scirtetoides* Reuter.

Diagram 6. Based on *Charagochilus taivanus* (Poppius).

Diagram 7. Based on *Orthops scutellatus* Uhler.

Diagram 8. Based on *Orthotylus* sp. 2.

Diagram 9. Based on *Excentricus planicornis* (Herrich-Scheffer).

Diagram 10. Based on *Mecomma capitata* Liu et Zheng.

are the only structures appearing in other taxa at both laterobasal portions of the aedeagus. For this reason, they are judged to be modifications of the phallobasal processes. They appear in their present positions due to having rotated.

External male genitalia of the *Teratofulvioides* sp. (Cylapinae) form

The phallus of *Teratofulvioides* sp. (Cylapinae: Fulvini) is diagrammed Diag. 11. In this case, the aedeagus (if present) is judged to be deeply invaginated into the exposed phallobasal conjunctival cavity. This judgment is based on the expanded ejaculatory duct situated in the exposed ejaculatory conjunctiva still being spiraled. The ejaculatory duct within the aedeagus is completely fused with the aedeagus, and is difficult to distinguish in the Miridae. The same is present in *Nesidiocoris tenuis* (Reuter) (Bryocorinae: Dicyphini).

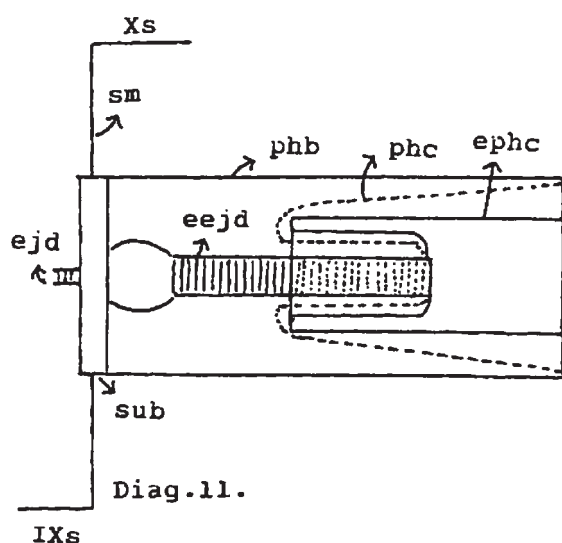


Diagram 11. Based on *Teratofulvioides* sp.

Terms, definitions, and abbreviations

The terms used in this investigation mostly follow Yang and Chang (2000).

Aedeagus (aed): The median evagination tube of the segmental membrane. It is judged to be an evolutionary event independent of the phallobase + phallobasal conjunctiva + connective.

Capitate processes (cap): The processes of the support bridge. This is present in the Leptopodomorpha, Cimicomorpha, and Pentatomomorpha.

Connective (con): The lower bulb-like growth of the segmental membrane, which is variable in

form, connecting the aedeagus or the phallobase with the genital styles.

Ejaculatory duct (ejd): The ectodermal invagination of the apex of the aedeagus.

Expanded ejaculatory duct (eejd): The expanded structure of the ejaculatory duct between the apex of the support tube and the base of the aedeagus. It is present only in the Miridae.

Exposed phallobasal conjunctiva (ephc): The bulb-like growth of the phallobasal conjunctiva between the phallobasal conjunctival processes (if they are present) and the base of the aedeagus, which is usually exposed in the genital chamber. It is present in part of the Miridae, Fulgoroidea, Cixiidae, and Derbidae.

Gonopore (gon): "The external opening of a genital duct" (Tuxan, [ed] 1970: 273). In the Miridae, it is the external opening of the aedeagus.

Genital plates (gp): The pair of plates at the posterior margin of abdominal sternite 9.

Genital styles (gs): The lateral portions of the lower diverticulum evagination of the segmental membrane; it is highly variable in form and has a grasping role during copulation.

Ligamentary processes (lig): Processes connecting the connective with the genital plates.

Phallobasal conjunctiva (phc): The inner wall of the upper bulb-like growth of segmental membrane round the base of the aedeagus. The phallobase and the phallobasal conjunctiva are judged to be an evolutionary event independent of the aedeagus.

Phallobasal conjunctival processes (phcp): The paired tubular evaginations of the phallobasal conjunctiva.

Phallobase (phb): The external wall of the upper bulb-like growth of the segmental membrane round the base of the aedeagus.

Phallus (pha): The intromittent organ including the connective, support bridge, support tube, phallobase, phallobasal conjunctiva, and aedeagus.

Segmental membrane (sm): The intersegmental membrane between the 9th and 10th abdominal sternites.

Sheath (sh): The differentiated structure of the retracted aedeagus and associated phallobasal conjunctiva.

Support bridge (sub): The differentiated structure of the dorsoanterior upper portion of the phallobase.

Support tube (sut): The differentiated structure of the dorsoanterior lower portion of the phallobase. It is tubular in form, which allows the ejaculatory duct to run through it.

Support ring (sur): The differentiated structure of the support tube, which is usually a ring-like structure supporting the expanded ejaculatory duct; it is present in part of the Miridae.

The Roman numerals IX, X, and XI refer to the respective abdominal segments; the letters t and s affixed to these respectively indicate whether it is the tergite or sternite of the particular segment.

ACKNOWLEDGMENTS

We would like to express our sincere thanks to Prof. L. Y. Zheng, Department of Biology, University of Nankai, Tianjin, China providing

Table 1. Synonymy of terms used for homologous structures of external male genitalia in the Miridae

Terms accepted in this investigation	Terms used by other authors
Aedeagus	Vesica <i>sensu</i> Singh-Pruthi (1925), Kelton (1959), and Konstantinov (2003) Ejaculatory duct within the bulbous vesica <i>sensu</i> Singh-Pruthi (1925) Ductus seminis inside of the bulbous vesica <i>sensu</i> Kelton (1959) and Konstantinov (2003)
Connective	Basal plates <i>sensu</i> Singh-Pruthi (1925) Phallobase <i>sensu</i> Kelton (1959) and Konstantinov (2003)
Ejaculatory duct	Ductus seminis <i>sensu</i> Kelton (1959) and Konstantinov (2003)
Expanded ejaculatory duct	Ejaculatory duct <i>sensu</i> Singh-Pruthi (1925) Duct seminis <i>sensu</i> Kelton (1959) Ductus ejaculatorius <i>sensu</i> Konstantinov (2003)
Exposed phallobasal conjunctiva	Bulbous vesica <i>sensu</i> Singh-Pruthi (1925) and Kelton (1959) Membranous lobes vesica <i>sensu</i> Konstantinov (2003)
Genital plates	Subgenital plates <i>sensu</i> Singh-Pruthi (1925) Cuplike sclerite <i>sensu</i> Konstantinov (2003)
Gonopore	Secondary gonopore <i>sensu</i> Konstantinov (2003)
Genital styles	Parameres <i>sensu</i> Singh-Pruthi (1925) and Konstantinov (2003) Clasper <i>sensu</i> Kelton (1959)
Phallobasal conjunctiva	Conjunctiva <i>sensu</i> Singh-Pruthi (1925) and Konstantinov (2003)
Phallobasal conjunctival processes	Conjunctiva appendages <i>sensu</i> Singh-Pruthi (1925)
Phallobase	Phallosoma <i>sensu</i> Singh-Pruthi (1925) Phallotheca <i>sensu</i> Kelton (1959) Theca <i>sensu</i> Konstantinov (2003)
Support bridge	Arms of the basal plates bridge prolonged into a pair of ligaments, e.g., in the Pentatomidae or struts, e.g., in the Reduviidae, Nepidae, etc. <i>sensu</i> Singh-Pruthi (1925) Ponticulus transversalis <i>sensu</i> Dupuis (1970)
Support tube	Basal plates bridge <i>sensu</i> Singh-Pruthi (1925) and Konstantinov (2003)
IX	Genital capsule <i>sensu</i> Konstantinov (2003)
X+XI	Proctiger <i>sensu</i> Konstantinov (2003)

valuable specimens and references. Thanks are given to Ms. M. L. Chan and Mr. Weili Lan illustrate the frontispiece. Thanks are also given to two anonymous reviewers who provided valuable comments on this manuscript. This research was supported by a grant (NSC93-2621-B-178-001) from the National Science Council, Taiwan.

RESULTS

I. Subfamily Isometopinae

(1) Tribe Isometopini

1. *Myiomma zhengi* Lin and Yang, 2004

Fig. 1

Abdominal segment IX with incompletely fused tergite and sternite. Apex of tergite 0.29 times width of widest portion; apical margin slightly emarginated. Sternite with asymmetrical apex, base of left genital style distinctly notched. Abdominal segment X transverse. Abdominal segment XI not examined. Genital plates arched, narrow. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge poorly developed, lower portion difficult to recognize in lateral view. Capitae processes small. Support tube not upraised. Expanded ejaculatory duct separated into 2 parts; basal part elongate ovate, not spiraled; apical part slender, spiraled. Phallobasal conjunctiva difficult to distinguish, without an appendage. Aedeagus moderately long, stiff, converging to apex. Gonopore difficult to recognize.

Specimen examined: After Lin and Yang (2004: 32).

2. *Myiomma semuelsoni* Miyamoto, 1965

Fig. 2

Abdominal segment IX with incompletely fused tergite and sternite. Apex of tergite 0.44 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, both margins with distinguishable notching. Abdominal segment X transverse. Abdominal segment XI not examined. Genital plates arched, narrow. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge poorly developed. Capitae processes small.

Support tube not upraised. Expanded ejaculatory duct separated into 2 parts; basal part rounded, not spiraled; apical part slender, spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Aedeagus not examined.

Specimen examined: After Lin and Yang (2004: 33).

3. *Myiomma choui* Lin and Yang, 2004

Fig. 3

Abdominal segment IX with incompletely fused tergite and sternite. Apex of tergite 0.42 times width of widest portion; apical margin deeply emarginated. Sternite with asymmetrical apex, slightly produced medially, both margins notched. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge poorly developed, lower portion difficult to recognize in lateral view. Capitae processes small. Support tube not upraised. Expanded ejaculatory duct separated into 2 parts; basal part rounded, not spiraled; apical part slender, spiraled. Aedeagus moderately long, stiff. Gonopore difficult to recognize.

Specimen examined: After Lin and Yang (2004: 36).

4. *Sophianus formosanus* Lin and Yang, 2004

Fig. 4

Abdominal segment IX with incompletely fused tergite and sternite. Apex of tergite 0.54 times width of widest portion; apical margin deeply emarginated. Sternite with asymmetrical apex, right 1/2 somewhat transverse, left 1/2 distinctly notched. Abdominal segment X transverse. Abdominal segment XI not examined. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge poorly developed. Capitae processes small. Support tube not upraised. Expanded ejaculatory duct separated into 2 parts; basal part rounded, spiraled; apical part slender, spiraled. Aedeagus moderately long, stiff. Gonopore difficult to recognize.

Specimen examined: After Lin and Yang (2004: 36).

5. *Isometopus hasegawai* Miyamoto, 1965

Fig. 5

Abdominal segment IX with incompletely fused tergite and sternite. Apex of tergite 0.39 times width of widest portion; apical margin shallowly emarginated. Sternite with symmetrical apex, median portion distinctly produced caudad, quadrate; anterior margin incised medially. Abdominal segment X transverse. Abdominal segment XI not examined. Genital plates arched, both ends expanded. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge poorly developed. Capitae processes small. Support tube not upraised. Expanded ejaculatory duct not separated into 2 parts, of the same width and spiraled throughout its length. Phallobase and phallobasal conjunctiva not shortened. Exposed phallobasal conjunctiva differentiated, simple, without appendage; aedeagus completely covered, surface covered with cuticular spots. Aedeagus moderately long, stiff. Gonopore difficult to recognize.

Specimen examined: After Lin and Yang (2004: 30).

6. *Isometopus yehi* Lin

Fig. 6

Abdominal segment IX with incompletely fused tergite and sternite. Apex of tergite 0.56 times width of widest portion; apical margin shallowly emarginated. Sternite with symmetrical apex, median portion distinctly produced caudad, quadrate; anterior margin complete. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates arched, rather stout. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge poorly developed. Capitae processes somewhat large. Support tube not upraised. Expanded ejaculatory duct not separated into 2 parts, of the same width and spiraled throughout its length. Phallobase and phallobasal conjunctiva not shortened. Exposed phallobasal conjunctiva differentiated, slender, simple, without appendage, surface sparsely covered with cuticular spots, apex armed with dense spines, completely covering aedeagus. Aedeagus moderately long, stiff. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Nantou Co., Chunyang. 9 Mar.~6 June 2004. C. S. Lin and

W.T. Yang, Malaise trap. Det. by C. S. Lin.

(2) Tribe Diphlebini

7. *Diphleps unica* (Bergroth, 1924)

Fig. 7

No specimen was examined by the authors. The following information is cited from Konstantinov (2003: 27). "Genital capsule (= abdominal segment IX) trapeziform, more or less flattened in dorso-ventral direction and split into dorsal and ventral walls by thin membranous line in all examined representatives except *Diphleps unica*." On page 29, "Aedeagus (= phallus) Phallobase (= connective+support bridge) of regular form, Ductifer (= support tube) well developed. Dorsal connectives with weakly developed capitae processes. Theca (= phallobase) usually with comparatively weak sclerotization on apical part. Dorsal wall of theca slightly sclerotized than ventral wall. Theca with rounded mouth. Vesica (= aedeagus) absent in all representatives except in *Diphleps*." "In *Diphleps* endosoma differentiated into conjunctiva and vesica. Conjunctiva (= phallobasal conjunctiva) voluminous, armed with conjoined sclerotized spiculae. Vesica (= aedeagus) shaped as completely sclerotized rod, nearly round in cross-section and tapering towards apex. Opening of secondary gonopore (= gonopore) located in the middle of lateral wall of vesica. Unlike other isometopines, in *Diphleps* walls of proximal part of ductus seminis (= basal part of expanded ejaculatory duct) next to primary gonopore distinctly sclerotized." Aedeagus lengthened.

Remarks on Description of the Isometopinae

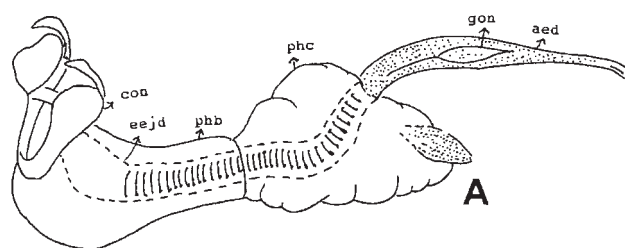


Fig. 7. *Diphleps unica*. A. phallus, lateral view (after Konstantinov, 2003, fig. 49).

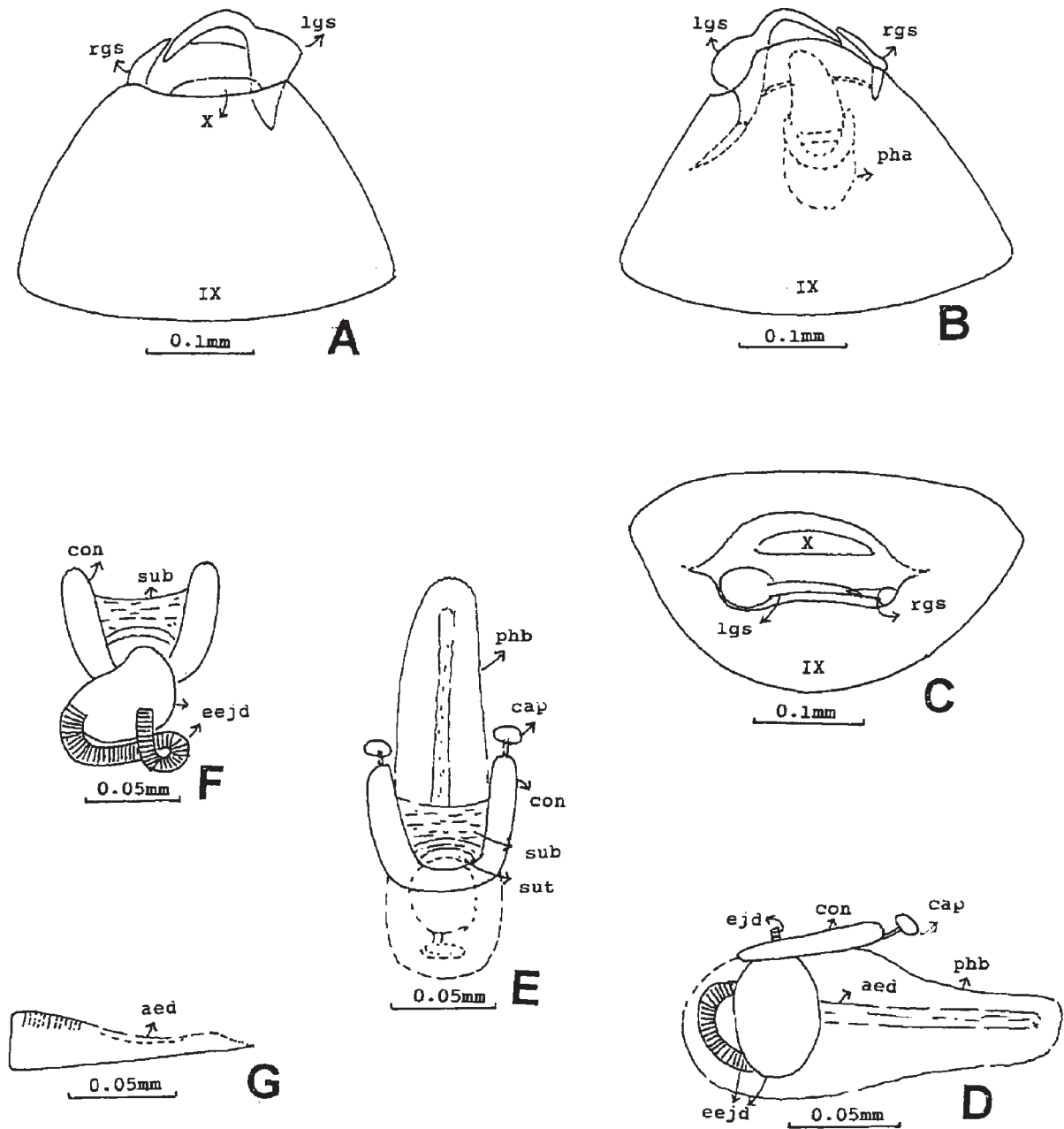


Fig. 1. *Myiomma zhengi*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, caudal view; D. phallus, lateral view; E. the same, dorsal view; F. connective and expanded ejaculatory duct, caudal view; G. aedeagus, lateral view (after Lin and Yang, 2004).

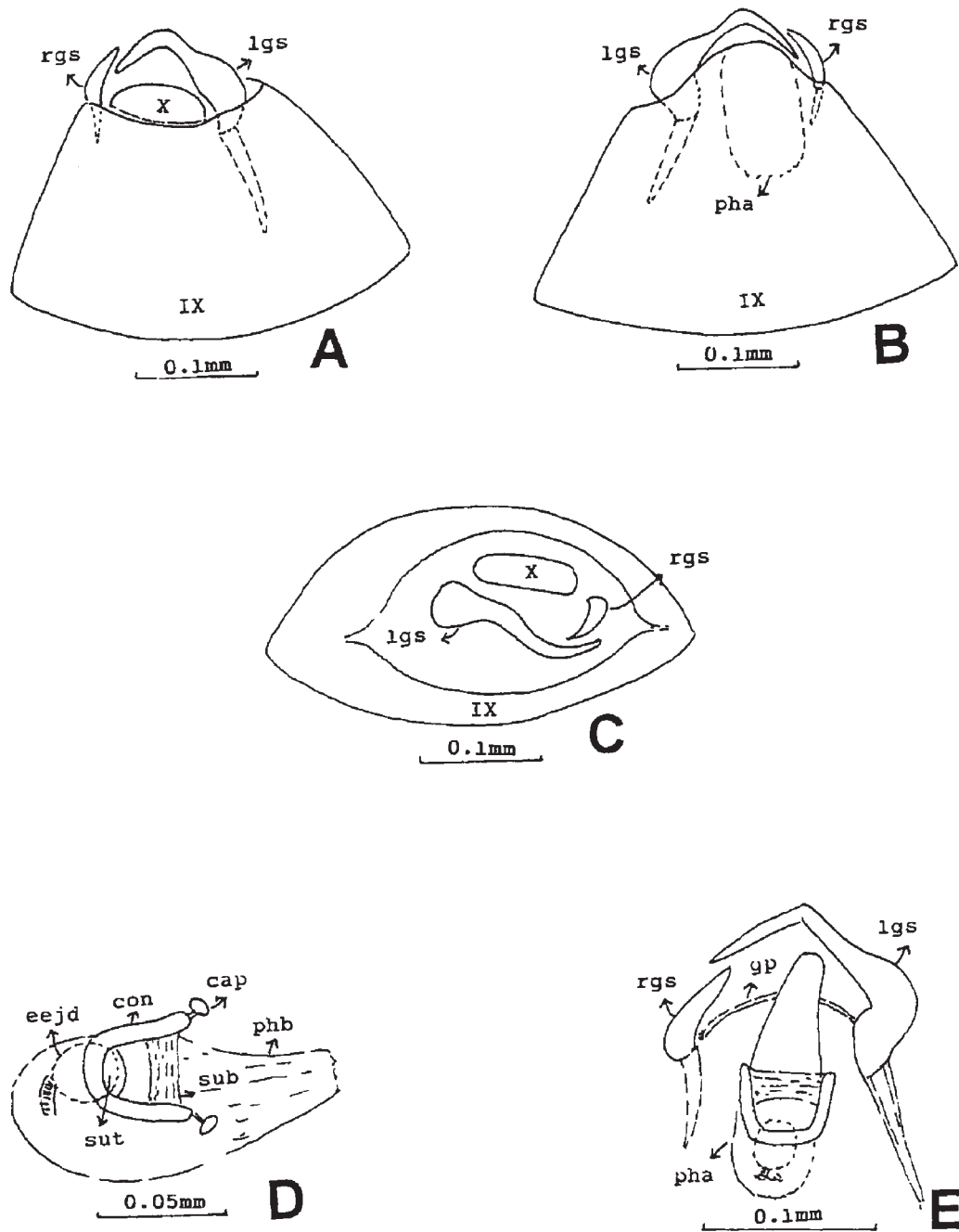


Fig. 2. *Myiomma samulsoni*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, caudal view; D. phallus, right dorsolateral view; E. phallus and genital styles, dorsal view (after Lin and Yang, 2004).

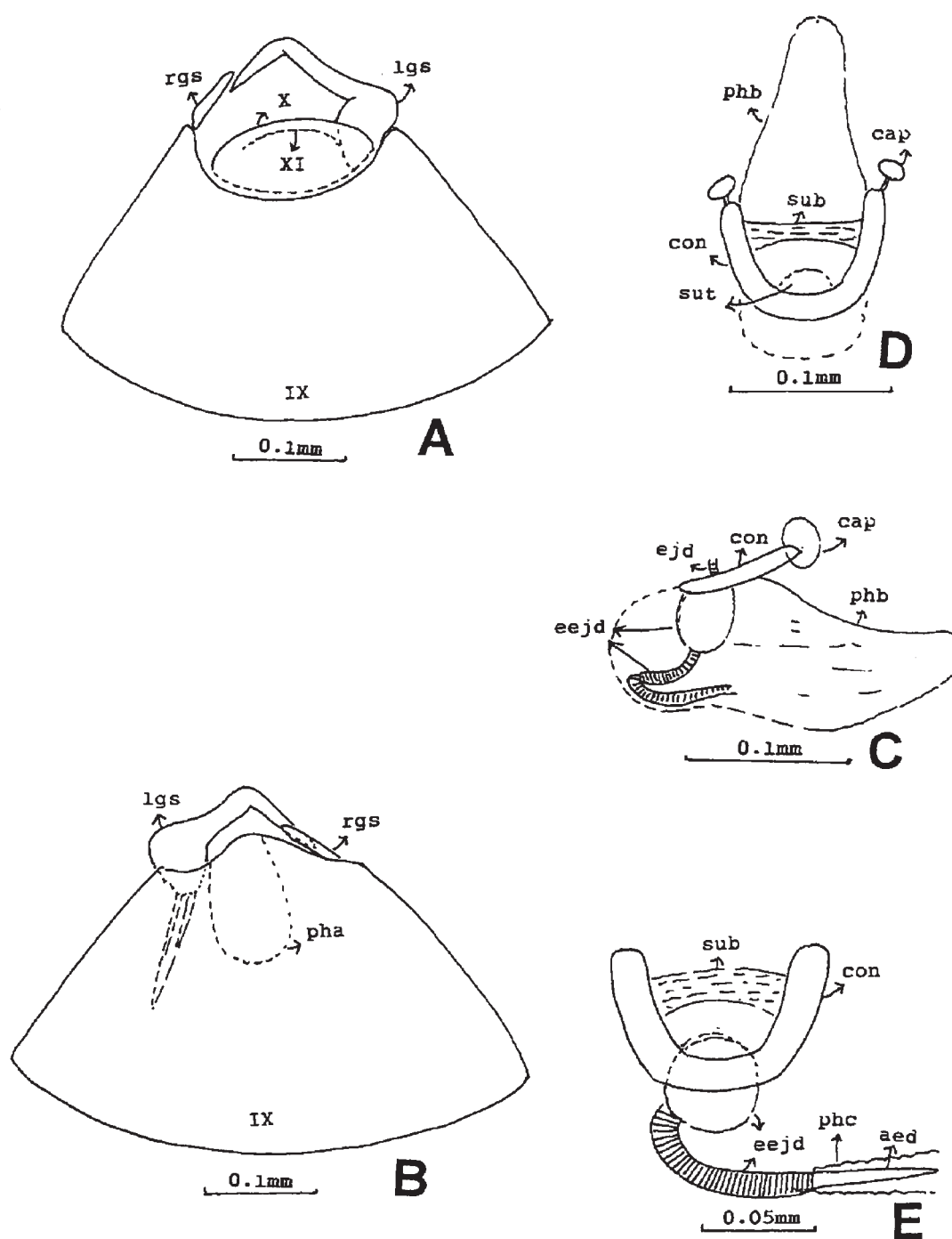


Fig. 3. *Myiomma choui*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. phallus, lateral view; D. the same, dorsal view; E. connective expanded ejaculatory duct and aedeagus, lateral view (after Lin and Yang, 2004).

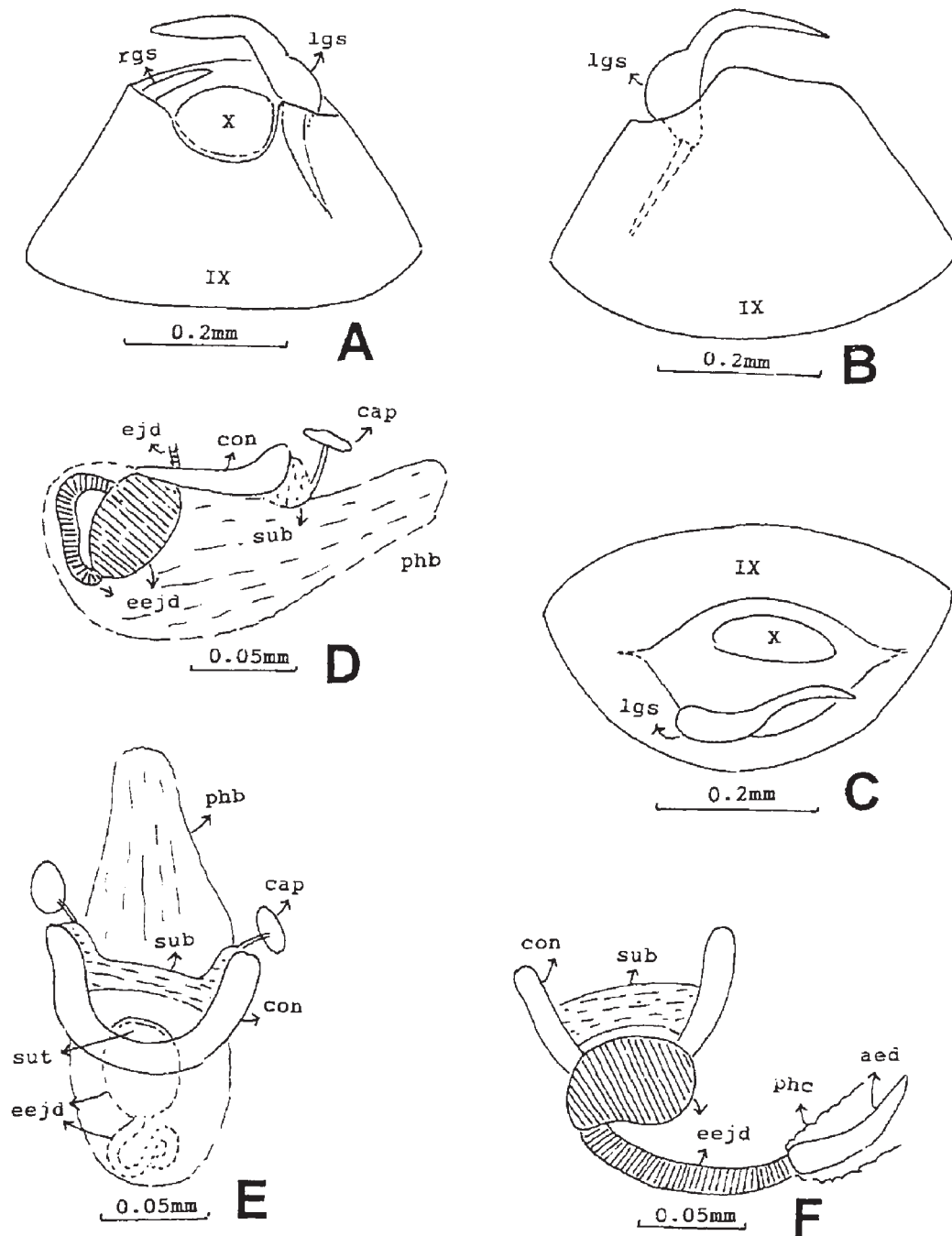


Fig. 4. *Sophianus formosanus*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, caudal view; D. phallus, lateral view; E. the same, dorsal view; F. connective, expanded ejaculatory duct and aedeagus, lateral view (after Lin and Yang, 2004).

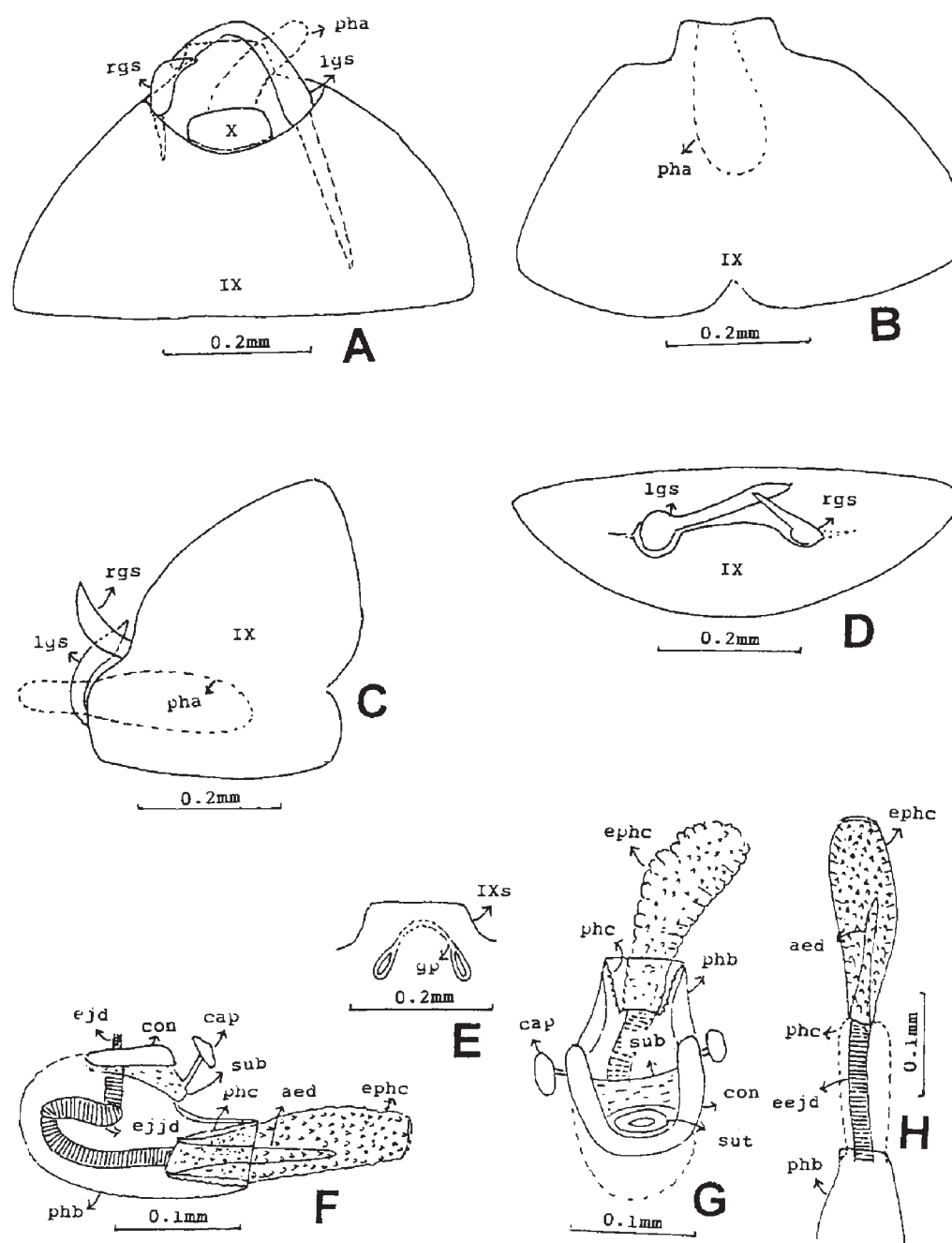


Fig. 5. *Isometopus hasegawai*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, right lateral view, slightly dorsad; D. the same, caudal view; E. apex of abdominal sternite IX and genital plates, dorsal view; F. phallobase, lateral view; G. the same, dorsal view; H. aedeagus in complete eversion, dorsal view (after Lin and Yang, 2004).

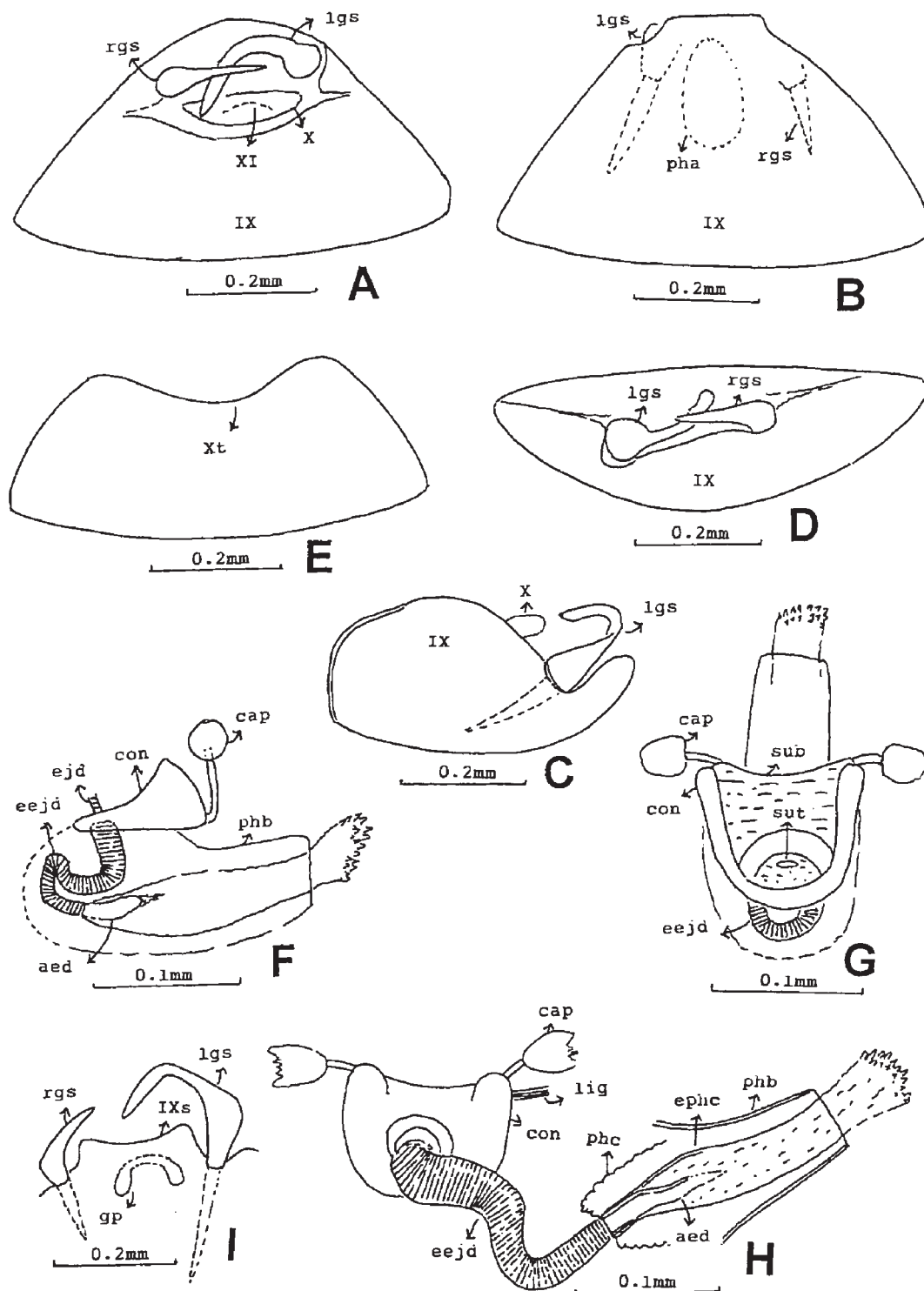


Fig. 6. *Isometopus yehi*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. abdominal tergite IX, dorsal view; F. phallus, lateral view; G. the same, dorsal view; H. the same with part of the phallobase removed, lateral view; I. apex of abdominal sternite IX and genital plates, dorsal view.

Abdominal segment IX with incompletely fused or completely fused tergite and sternite; not dorsoventrally elongate quadrate in lateral view; its posterior opening not directed ventrocaudad; its anterior margin with an undifferentiated extension; its surface without a process. Abdominal segment X transverse; directed caudad; situated after abdominal tergite IX. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete. Support bridge poorly developed, not winged. Capitae processes differentiated, small. Expanded ejaculatory duct either not separated into 2 parts, of the same width and spiraled throughout its length; or separated into 2 parts, basal part rounded, either spiraled or not, apical part slender, spiraled. Sheath undifferentiated. Neither phallobase nor phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber undifferentiated. Exposed phallobasal conjunctiva either undifferentiated or differentiated. Aedeagus moderately long or lengthened. Gonopore either difficult to recognize or well defined.

II. Subfamily Psallopinae

(3) Tribe Psallopini

8. *Psallops formosanus* Lin, 2004

Fig. 8

Apex of abdominal tergite IX 0.35 times width of widest portion; apical margin deeply emarginated; basal 2/3 of median line membranous. Sternite with symmetrical apex, median portion broadly produced caudad, rounded. Abdominal segment X transverse. Abdominal segment XI not examined. Genital plates arched. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge well developed; very large in lateral view. Capitae processes moderately large. Support tube small. Support ring differentiated, tube-shaped. Expanded ejaculatory duct separated into 2 parts; basal part lightly pigmented, rod-like, not spiraled; apical part rather broad, spiraled. Sheath differentiated, rather large, weakly sclerotized. Neither phallobase nor phallobasal conjunctiva shortened. Exposed ejaculatory conjunctiva differentiated, bulbous, dorsoapical portion with a tuft of a spine, basoventral portion with 3

processes. Aedeagus shortened, extremely reduced, seemingly only gonopore existing. Gonopore defined, with transverse ridges in half-circle.

Specimen examined: 1 male. Taiwan: Nantou C0., Lienhuachih. June 1984, K. S. Lin and K. C. Chou, Malaise trap. Det. by C. S. Lin

9. *Psallops leae* Lin, 2004

Fig. 9

Apex of tergite IX 0.37 times width of widest portion; apical margin deeply emarginated, median portion without membranous line. Sternite with slightly asymmetrical apex. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge well developed. Capitae processes moderately large. Support ring differentiated, short tube-shaped. Expanded ejaculatory duct separated into 2 parts; basal part lightly pigmented, not spiraled; apical part rather broad, spiraled. Sheath differentiated, large, apex obliquely truncated. Phallobase and phallobasal conjunctiva not shortened. Exposed phallobasal conjunctiva differentiated, bulbous, in an inflated condition, dorsoapical portion with a tuft of spines, ventrocaudal portion with single, long process and 2 tufts of spines. Aedeagus shortened, extremely reduced, seemingly only gonopore present. Gonopore defined, with transverse ridges in half-circle.

Remarks on Description of the Psallopinae

Abdominal segment IX with completely fused tergite and sternite; not dorsoventrally elongate quadrate in lateral view; its posterior opening not directed ventrocaudad; its anterior margin with undifferentiated extension; its surface without a process. Abdominal segment X transverse; directed caudad; situated after abdominal tergite IX. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete. Support bridge well developed, not winged. Capitae processes differentiated. Expanded ejaculatory duct separated into 2 parts; basal part variable in form, not spiraled; apical part slender, spiraled. Sheath differentiated. Neither phallobase nor phallobasal

conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber differentiated. Exposed phallobasal conjunctiva differentiated. Aedeagus shortened. Gonopore defined, with transverse ridges.

III. Subfamily Cylapinae

(4) Bothriomirini

10. *Bothriomiris lugubris* Poppius, 1915

Fig. 10

Median portion of left margin of abdominal segment IX with a stout process, directed caudad. Apex of abdominal tergite IX 0.53 times width of widest portion; apical margin deeply emarginated obliquely. Sternite with slightly asymmetrical apex. Abdominal segment X transverse, directed to left and laterocaudad. Abdominal segment XI not retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes moderately large. Support tube not upraised. Expanded ejaculatory duct separated into 2 parts; basal part lightly pigmented, except caudal margin heavily pigmented, not spiraled; apical part slender, spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Exposed phallobasal conjunctiva bulbous, with 4 different forms of processes. Aedeagus and gonopore wholly reduced.

Specimen examined: 1 male. Taiwan: Nantou Co., Lienhuachih. 9 Sept.~14 Oct. 2002. C.S. Lin and W.T. Yang, Malaise trap. Det. by C. S. Lin.

11. *Cylapomorpha michikoeae* Yasunaga, 2000

Fig. 11

Mid-dorsoapical portion of abdominal segment IX with a process. Apex of abdominal tergite IX 0.45 times width of widest portion; apical margin deeply emarginated. Sternite with slightly asymmetrical apex. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates arched, both ends expanded. Genital styles asymmetrical in shape and size, one on left slightly larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes moderately large. Support tube not upraised.

Expanded ejaculatory duct separated into 2 parts; basal part slender, lightly pigmented, not spiraled; apical part slender, spiraled. Support ring ring-like. Neither phallobase nor phallobasal conjunctiva shortened. Exposed phallobasal conjunctiva bulbous, seemingly 2-lobed, surface armed with longitudinal ridges and 2 rows of short spines. Aedeagus and gonopore wholly reduced.

Specimen examined: 1 male. Taiwan: Nantou Co., Lienhuachih. 10 June~7 July 2003. C. S. Lin and W. T. Yang. Det. by C. S. Lin.

(5) Fulvini

12. *Peritropis punctatus* Carvalho & Lorenzato, 1978

Fig. 12

Abdominal tergite IX 0.49 times width of widest portion; apical margin shallowly emarginated. Sternite with seemingly symmetrical apex, median portion produced caudad, rounded. Abdominal segment X transverse. Abdominal segment XI not examined. Genital plates not examined. Genital styles asymmetrical in shape and size, one on right larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes moderately large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part lightly pigmented, rod-like, rather narrow, not spiraled; apical part slender, spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Exposed phallobasal conjunctiva bulbous, with 3 long processes. Aedeagus and gonopore wholly reduced.

Specimen examined: 1 male. Taiwan: Pingtung, Co., Lilunshan. 16 Mar.~16 Apr. 2001. H. T. Shih and N. T. Chang, Malaise trap. Det. by C. S. Lin.

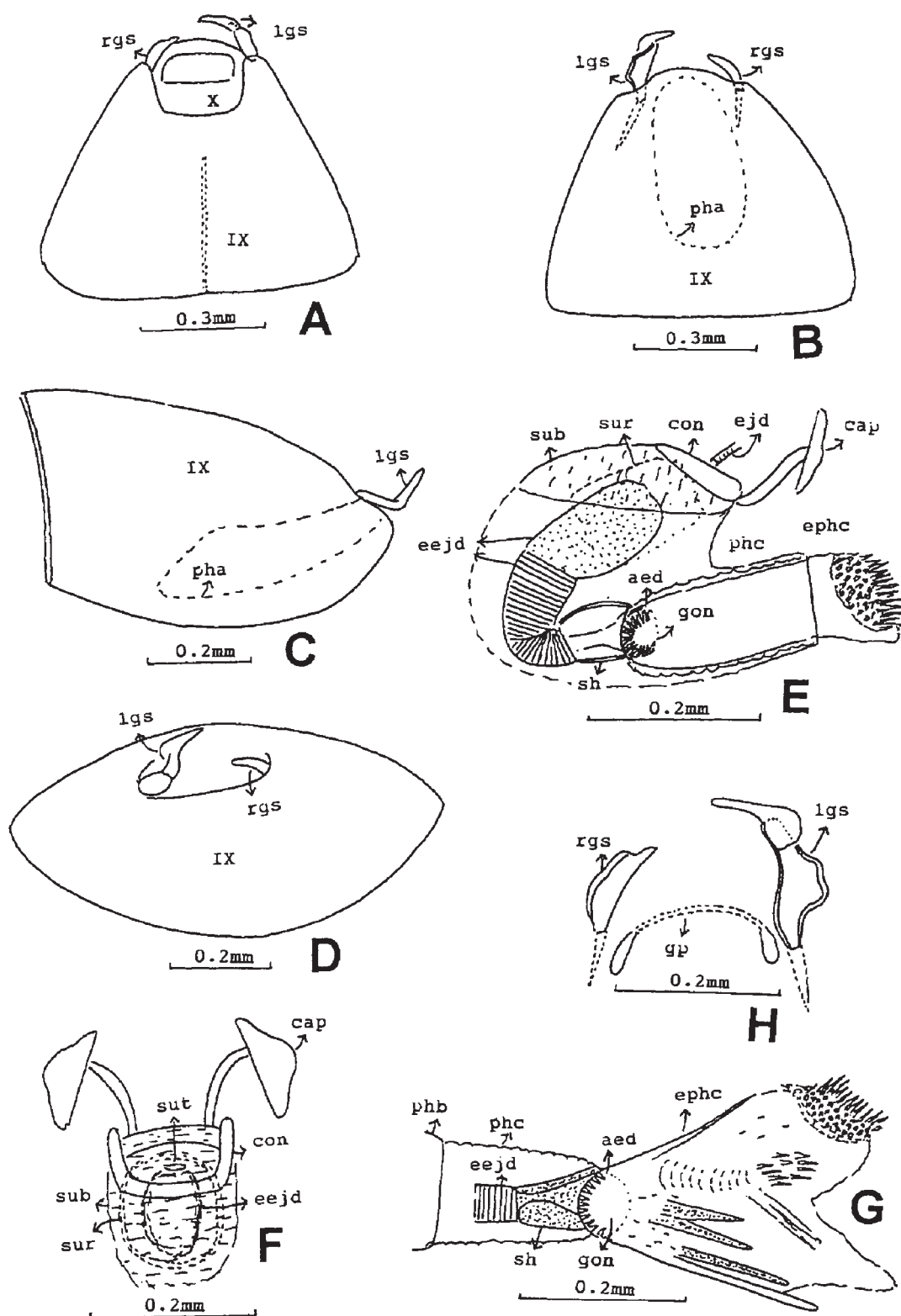


Fig. 8. *Psallops formosanus*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. connective, support bridge and support tube, dorsal view; G. aedeagus wholly everted, lateral view; H. genital styles and genital plates, dorsal view.

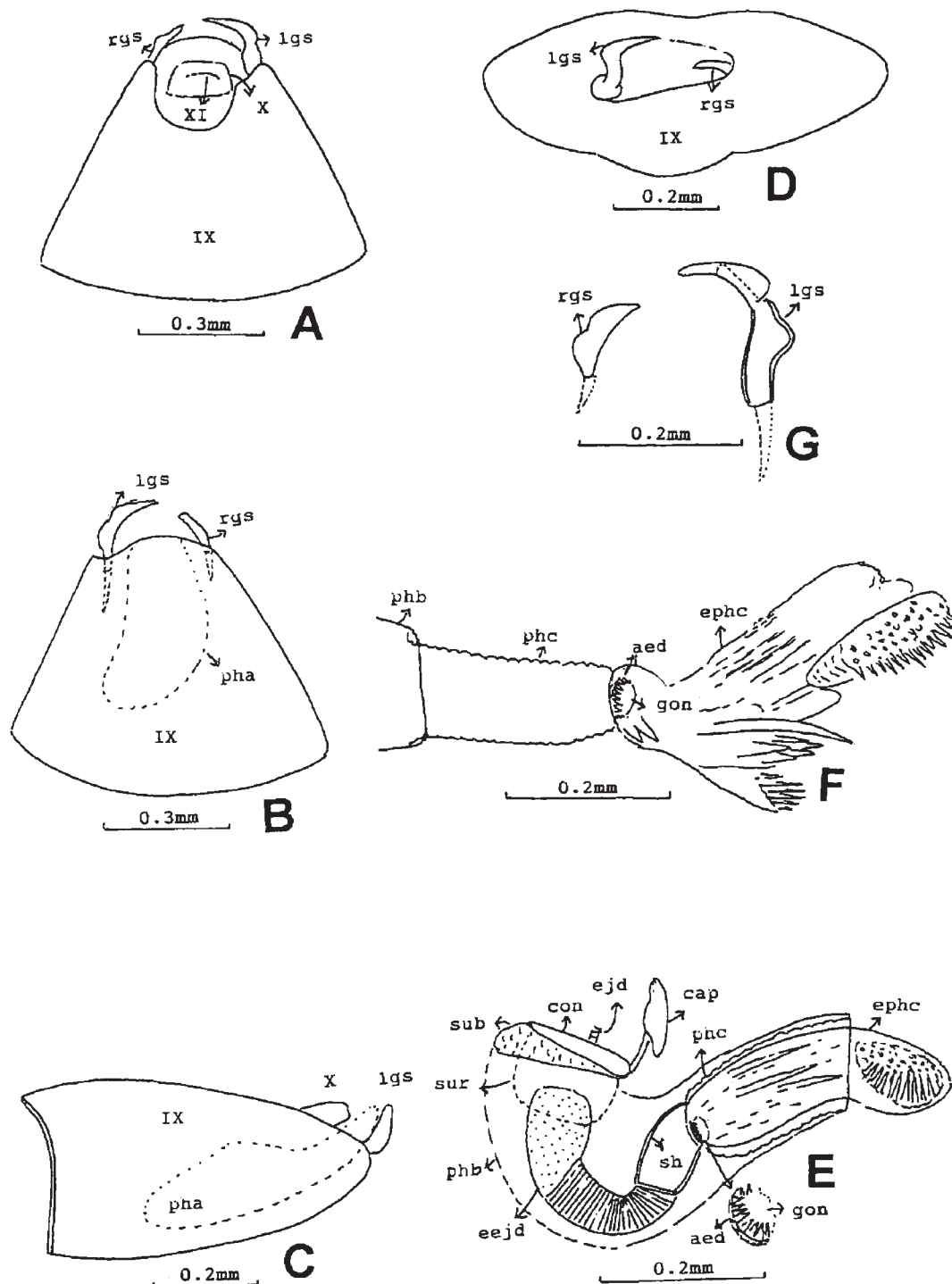


Fig. 9. *Psallops leae*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. aedeagus in complete eversion, lateral view; G. genital styles, dorsal view.

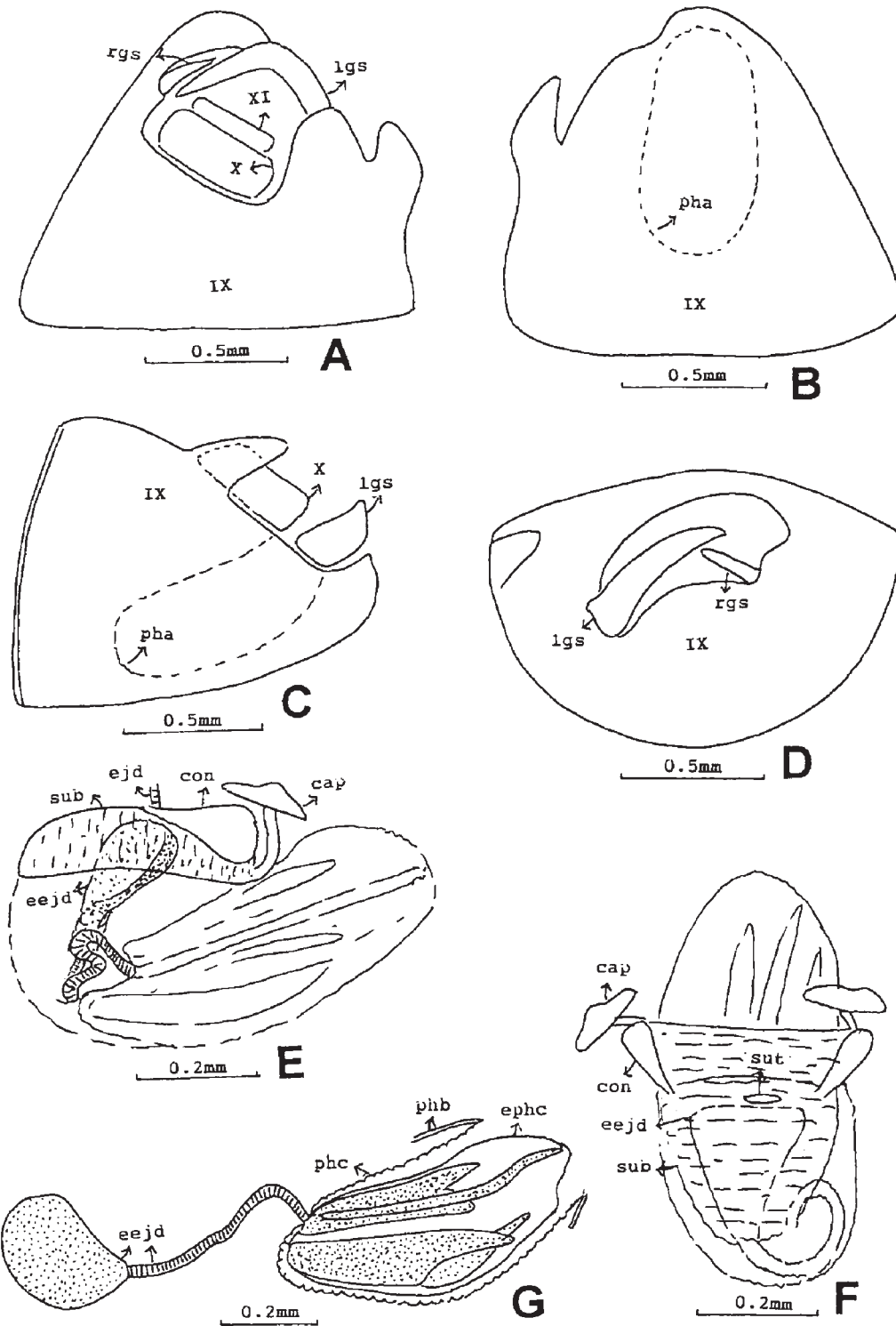


Fig. 10. *Bothriomiris lugubris*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. aedeagus in complete eversion, lateral view.

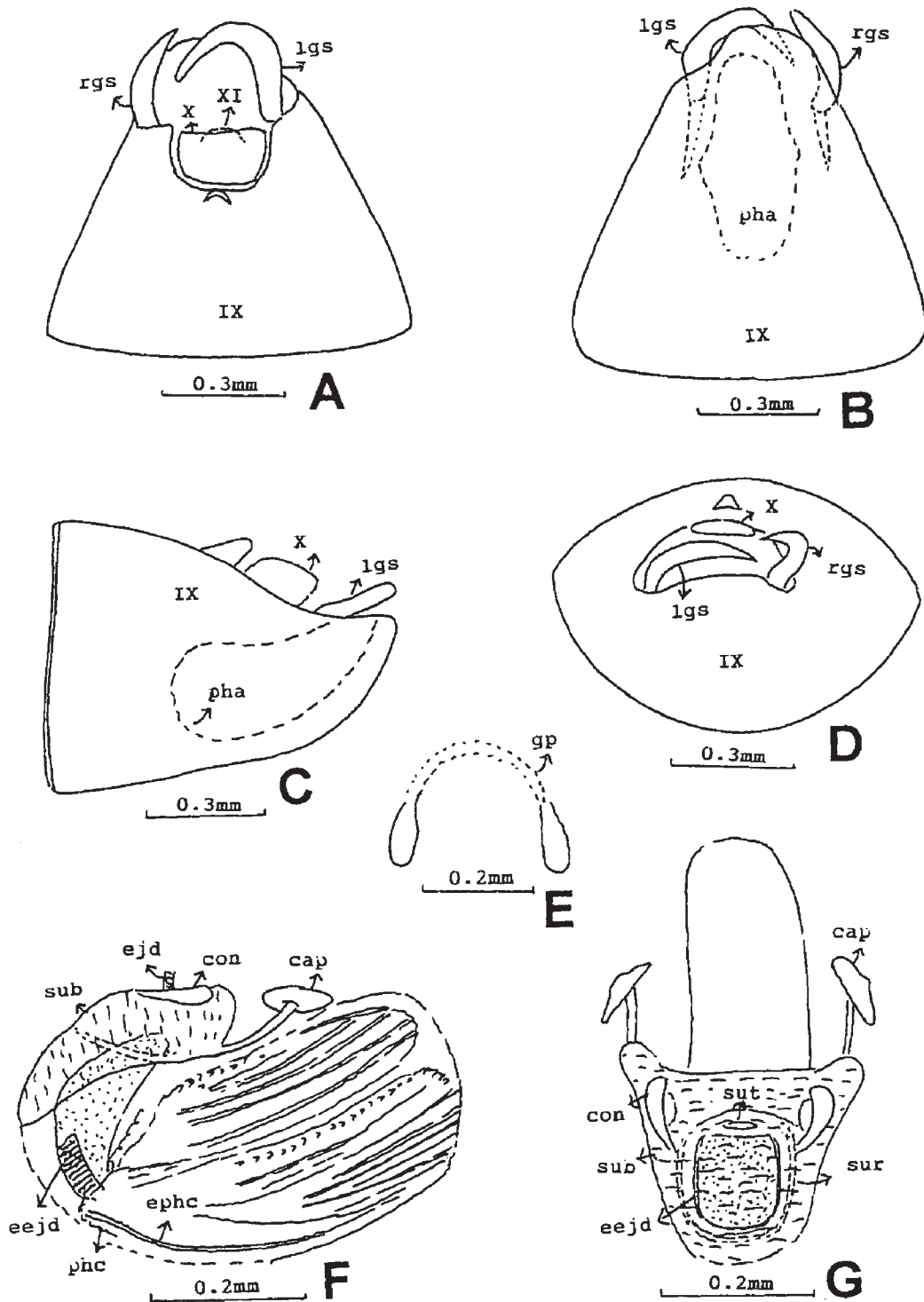


Fig. 11. *Cylapomorpha michikoeae*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. genital plates, dorsal view; F. phallus, lateral view; G. the same, dorsal view.

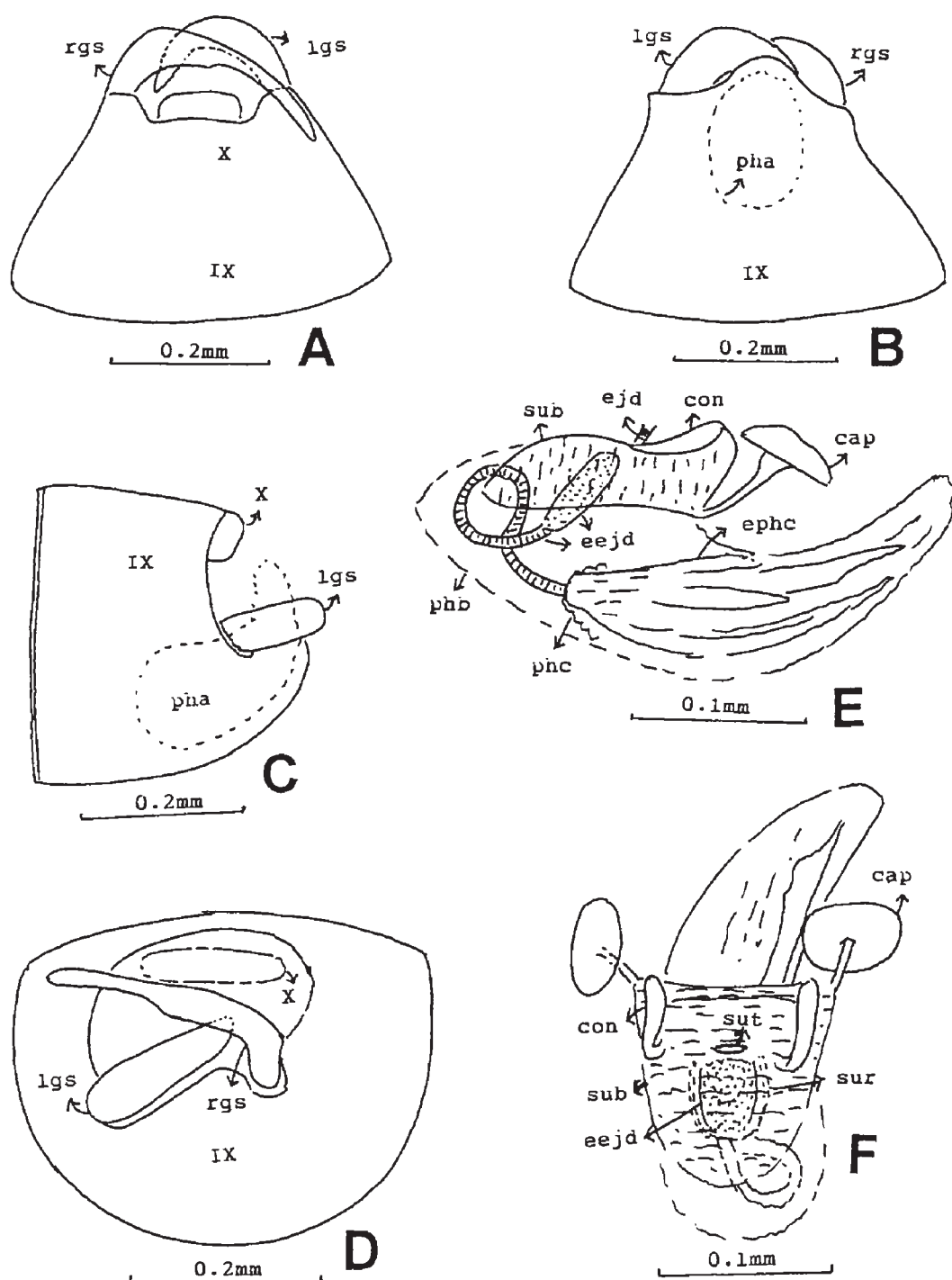


Fig. 12. *Peritropis punctatus*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view.

13. *Teratofulvioides* sp.

Fig. 13

Apex of abdominal tergite IX 0.46 times width of widest portion; apical margin deeply emarginated. Sternite with symmetrical apex, broadly produced caudad, rounded. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left slightly larger. Connective complete, U-shaped. Support bridge poorly developed, produced dorsad in lateral view. Capitate processes rather small. Support tube not upraised. Expanded ejaculatory duct separated into 2 parts; basal part lightly pigmented, converging to apex, not spiraled; apical part slender, spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Exposed phallobasal conjunctiva bulbous, without any appendage. Aedeagus wholly reduced. Gonopore wholly reduced.

Specimen examined: 1 male. Taiwan: Nantou Co., Howang., Hweisuan. 15~16 Aug. 2002. W. T. Yang, mercury light. Det. by C. S. Lin.

Remarks on Description of the Cylapinae

Abdominal segment IX with completely fused tergite and sternite; not dorsoventrally elongate quadrate in lateral view; its posterior opening not directed ventrocaudad; its anterior margin with undifferentiated extension; its surface with or without a process. Abdominal segment X transverse; directed caudad; or left laterocaudad; situated after abdominal tergite IX. Genital styles asymmetrical in shape and size, one either on left or on right larger.

Connective either complete or with reduced transverse portion. Support bridge either poorly or well developed, not winged. Capitate processes differentiated. Expanded ejaculatory duct separated into 2 parts; basal part variable in form, not spiraled; apical part slender, spiraled. Sheath undifferentiated. Neither phallobase nor phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber undifferentiated. Exposed phallobasal conjunctiva differentiated. Aedeagus and gonopore wholly reduced.

IV. Subfamily Orthotylinae**(6) Tribe Halticini**14. *Strongylocoris niger* (Herrich-Schaeffer, 1835)

Fig. 14

Apex of abdominal tergite IX 0.63 times width of widest portion; apical margin deeply emarginated. Sternite with seemingly symmetrical apex. Abdominal segment X transverse, somewhat directed to right and laterocaudad. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitate processes moderately large. Support tube not upraised. Expanded ejaculatory duct not separated into 2 parts, lightly pigmented, not spiraled, rod-like, narrow. Sheath differentiated, small. Neither phallobase nor phallobasal conjunctiva shortened. Phallobase with sclerotized apical portion. Exposed ejaculatory conjunctiva undifferentiated. Aedeagus lengthened, reaching apex of phallobase, stiff. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Nantou., Lushan. 27~31 May 1980. K. S. Lin and L. Y. Chou. Det. by C. S. Lin.

15. *Labops sahlbergii* (Fallen, 1829)

Fig. 15

Abdominal tergite IX 0.39 times width of widest portion; apical margin deeply emarginated, especially median portion. Sternite with seemingly symmetrical apex. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape, one on left stouter.

Connective with reduced transverse portion. Support bridge well developed. Capitate processes moderately large. Support tube rather dorsad. Expanded ejaculatory duct separated into 2 parts; basal part lightly pigmented, subparallel-sided, not spiraled; apical part rather broad, spiraled. Sheath rather large, pigmented, trapezoid. Neither phallobase nor phallobasal conjunctiva shortened. Exposed phallobasal conjunctiva bulbous, its basodorsal portion with a tuft of long spines. Aedeagus very short. Gonopore undefined, with sclerotized ridges.

Specimen examined: 1 male. Inner Mongolia. 2 Aug. 1908. C. Y. Lee. Det. by L. Y. Zheng.

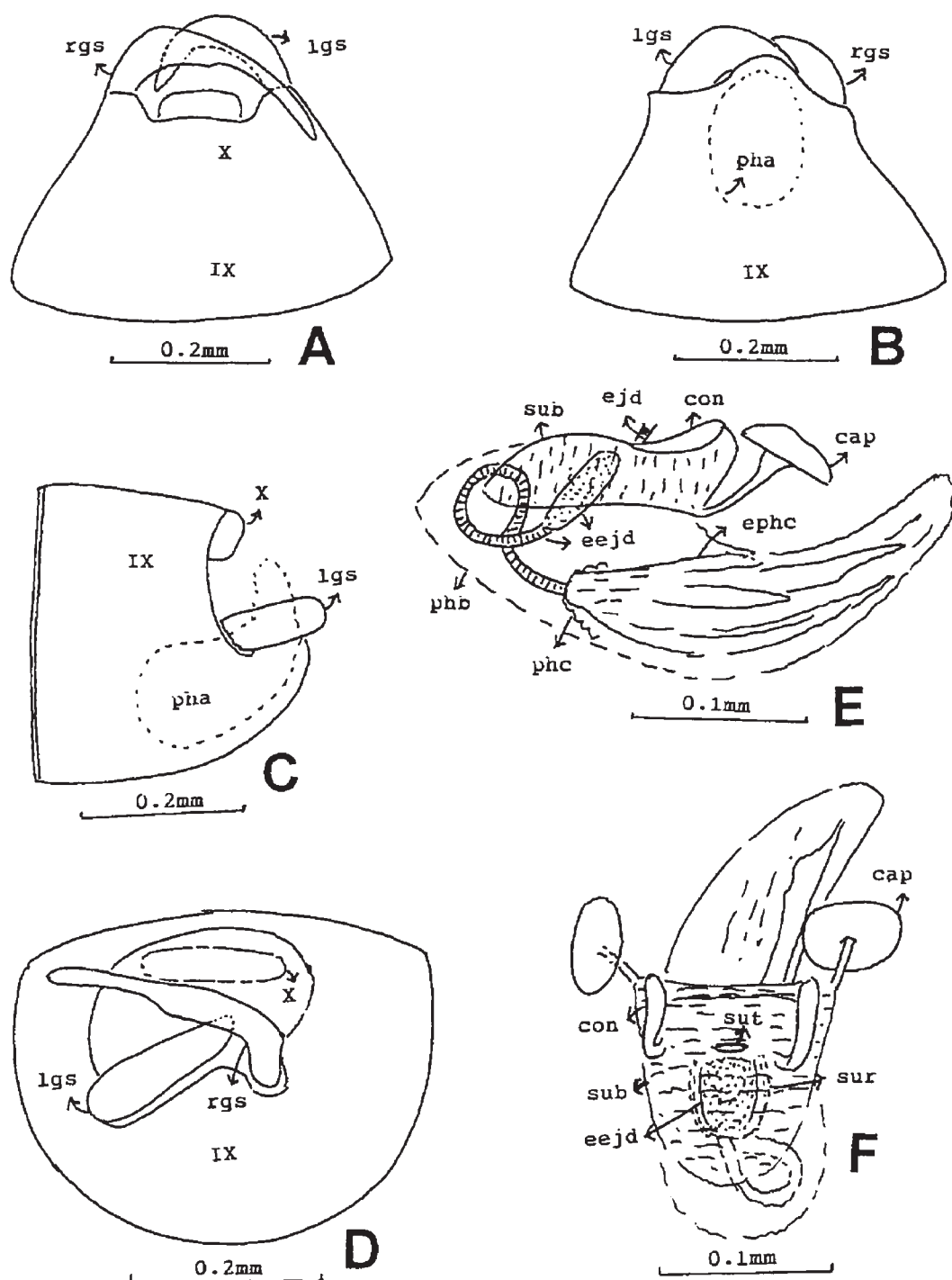


Fig. 13. *Teratofulvioides* sp. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view.

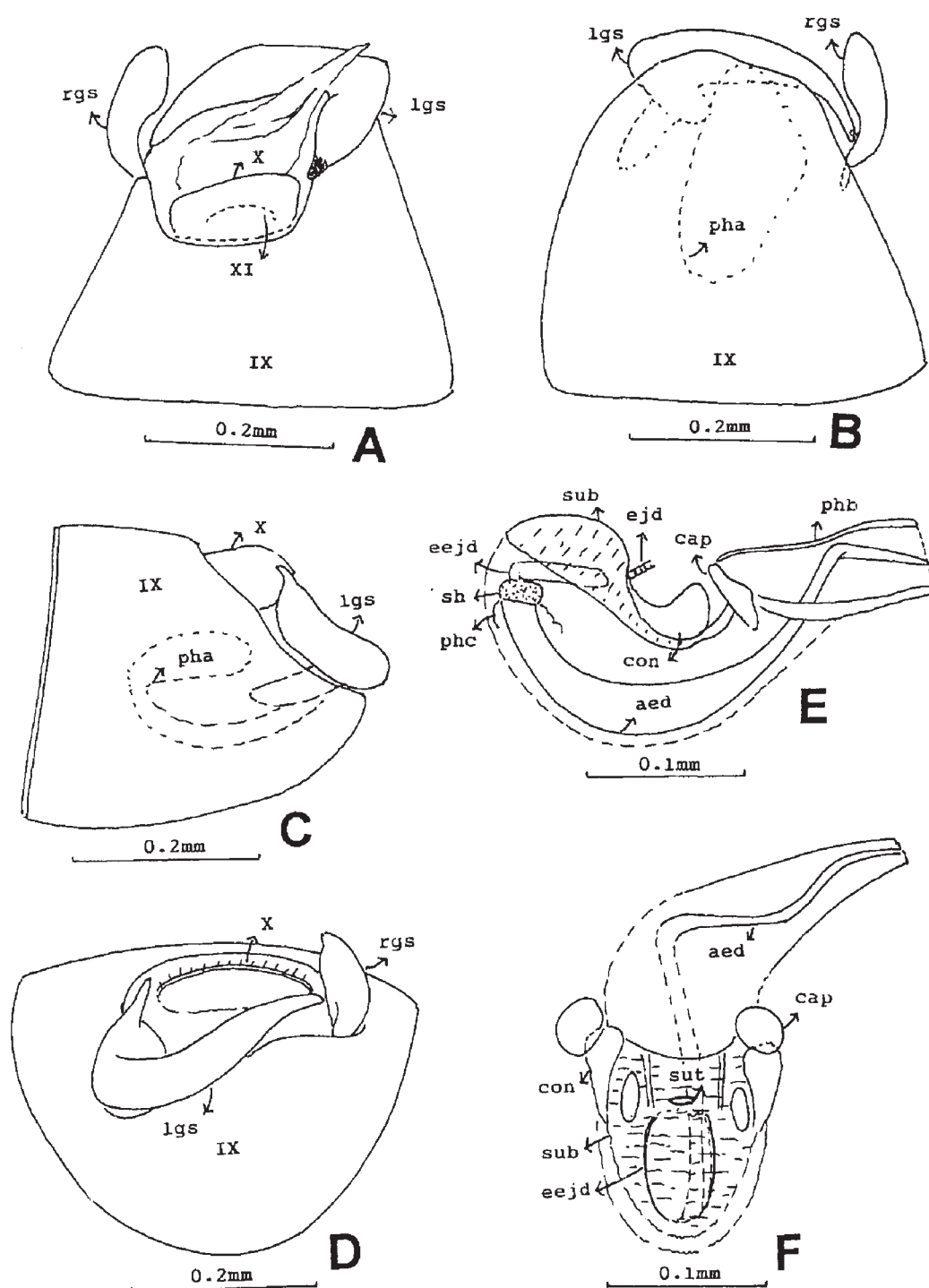


Fig. 14. *Strongylocoris niger*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view.

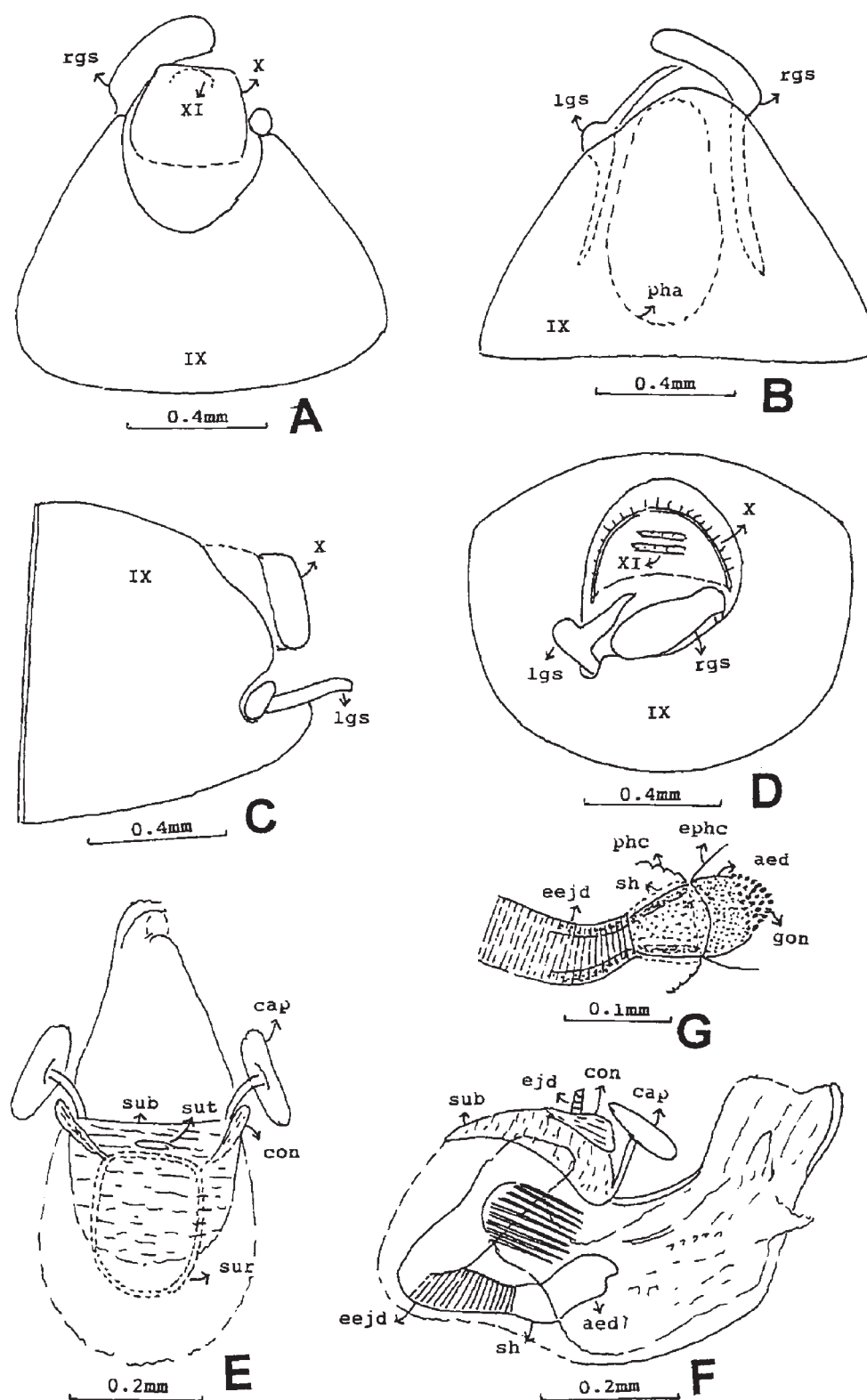


Fig. 15. *Labops sahlbergii*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, dorsal view; F. the same, lateral view; G. sheath and aedeagus, lateral view.

16. *Orthocephalus funestus* Jakovlev, 1881
Fig. 16

Apex of abdominal tergite IX 0.40 times width of widest portion; apical margin deeply emarginated. Sternite with symmetrical apex. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape, one on left stouter.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes comparatively large. Support tube rather dorsad. Expanded ejaculatory duct separated into 2 parts; basal part lightly pigmented, stout, not spiraled; apical part slender, spiraled. Sheath rather large, pigmented, trapezoid. Neither phallobase nor phallobasal conjunctiva shortened. Exposed phallobasal conjunctiva bulbous, with a long process. Aedeagus very short. Gonopore undefined, with sclerotized ridges.

Specimen examined: 1 male. China: Hubei Prov., Shennan. 27 June 1997. C. Mu

17. *Halticus bractatus* (Say, 1832)
Fig. 17

Apex of abdominal tergite IX 0.30 times width of widest portion; apical margin straight, not emarginated. Sternite with asymmetrical apex, obliquely truncated. Abdominal segment IX quadrate in lateral view; transverse ovate in caudal view. Abdominal segment X transverse, as wide as apex of tergite IX. Abdominal segment XI not retracted into segment X. Genital plates not examined. Genital styles seemingly symmetrical in shape and size.

Connective with reduced transverse portion. Support bridge well developed, dorsolateral portions winged laterally. Capitae processes comparatively small. Expanded ejaculatory duct separated into 2 parts; basal part lightly pigmented, convergent to apex, not spiraled; apical part rather broad, spiraled. Sheath quadrate. Neither phallobase nor phallobasal conjunctiva shortened. Exposed phallobasal conjunctiva tube-shaped, small, not exposed in genital chamber. Aedeagus and gonopore wholly reduced.

Specimen examined: 1 male. Inner Mongolia, 12 June 1988. C. Y. Lee.

18. *Halticus tibialis* Reuter, 1891
Fig. 18

Apex of abdominal tergite IX 0.47 times width of widest portion; apical margin deeply emarginated. Sternite with seemingly symmetrical apex, broad, roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes moderately large. Support tube not upraised. Expanded ejaculatory duct separated into 2 parts; basal part subquadrate, lightly pigmented, not spiraled; apical part rather broad, spiraled. Sheath undifferentiated. Neither phallobase nor phallobasal conjunctiva shortened. Exposed phallobasal conjunctiva tube-shaped, pigmented, partly exposed in genital chamber. Aedeagus and gonopore wholly reduced.

Specimen examined: 1 male. Taiwan: Pingtung Co., Liuchiu I., 22~23 July 1982. K. C. Chou and C. C. Pan. Det. by C. S. Lin.

19. *Coriodromis chinensis* Liu et Zao, 1999
Fig. 19

Apex of abdominal tergite IX 1.10 times width of anterior narrowest portion; apical margin not emarginated. Tergite extremely short, situated at posterior portion of segment. Sternite broadest at apex, left 1/3 with membranous line reaching middle of segment. Abdominal segment X transverse, situated near left margin in dorsal view. Abdominal segment XI not examined. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger, both styles closely situated somewhat to right.

Phallus situated rather to right within segment IX. Connective with reduced transverse portion. Support bridge well developed. Capitae processes small, cone-shaped. Support tube not upraised. Expanded ejaculatory duct seemingly separated into 2 parts; basal part extremely large, membranous, convergent to apex, not spiraled; apical part very small, seemingly spiraled. Sheath undifferentiated. Neither phallobase nor phallobasal conjunctiva shortened. Exposed phallobasal conjunctiva tube-shaped, sinuate, most parts exposed in genital chamber. Aedeagus and gonopore wholly reduced.

Specimen examined: 1 male. Taiwan: Nantou Co., Lienhuachih. 6 Jan.~12 Feb. 2003. C. S. Lin and W. T. Yang, Maise trap. Det. by C. S. Lin.

(7) Tribe Orthotylini**20. *Cyrtorhinus lividipennis* Reuter, 1885**

Fig. 20

Apex of abdominal tergite IX 0.37 times width of widest portion; apical margin not emarginated. Sternite with asymmetrical apex, characteristically emarginated near middle. Abdominal segment X elongate. Abdominal segment XI not retracted into segment X. Genital plates arched, uniformly wide. Genital styles asymmetrical, as figured.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes moderately large. Support tube rather upraised. Support ring recognizable. Expanded ejaculatory duct not separated into 2 parts, lightly pigmented, not spiraled. Sheath undifferentiated. Exposed phallobasal conjunctiva undifferentiated. Neither phallobase nor phallobasal conjunctiva shortened. Aedeagus moderately long, stiff. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Pingtung Co., Eluanpi. 12~13 June 1984. K. C. Chou and C. C. Pan. Det. by C. S. Lin.

21. *Pseudoloxops lateralis* (Poppius, 1915)

Fig. 21

Apex of abdominal tergite IX 0.50 times width of widest portion; apical margin deeply emarginated. Sternite with symmetrical apex, median portion acutely produced caudad into cone-shaped structure, armed with strong spines. Abdominal segment X elongate. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes moderately large. Support tube ovate. Expanded ejaculatory duct not separated into 2 parts, lightly pigmented, not spiraled. Sheath undifferentiated. Neither phallobase nor phallobasal conjunctiva shortened. Exposed phallobasal conjunctiva undifferentiated. Aedeagus lengthened, slightly extending over apex of phallobase, stiff. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Pingtung Co., Liuchiu I. 22~23 Mar. 1982. K. C. Chou and C. C. Pan. Det. by C. S. Lin.

22. *Latizanchius viridivittatus* Liu et Zheng, 2001

Fig. 22

Apex of abdominal tergite IX 0.56 times width of widest portion; apical margin deeply emarginated. Sternite with asymmetrical apex, right lateroapical portion deeply emarginated. Abdominal segment X transverse, directed to left and laterocaudad. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in size only, one on left slight larger.

Connective with reduced transverse portion. Support bridge well developed, apex produced dorsad, rod-like in lateral view. Capitae processes moderately large. Support tube not upraised. Expanded ejaculatory duct separated into 2 parts; basal part slender, lightly pigmented, not spiraled; apical part spiraled. Sheath undifferentiated. Phallobase and phallobasal conjunctiva inferred from following species, shortened and ventral phallobasal conjunctival processes exposed in genital chamber differentiated. Exposed phallobasal conjunctiva inferred from following species, differentiated into smaller and incompletely covered aedeagus, with single pigmented process, not serrated. Aedeagus shortened, rod-like. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Nantou Co., Tungpu. 20~24 Apr. 1982. T. Lin and K. C. Chou. Det. by C. S. Lin.

23. *Orthotylus* sp. 1

Fig. 23

Left apical median margin of abdominal segment IX with a short process. Apex of abdominal tergite IX 0.50 times width of widest portion; apical margin strongly emarginated. Sternite with symmetrical apex, acutely produced caudad medially, armed with strong setae. Abdominal segment X transverse. Abdominal segment XI not examined. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes comparatively large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part moderately wide, heavily pigmented, not spiraled; apical part rather broad, spiraled. Sheath small. Both phallobase and

phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber differentiated, ventral one large, plate-shaped; dorsal one fused with dorsal sclerotized portion of phallobase. Exposed phallobasal conjunctiva differentiated, small, with 2 long, serrated processes. Aedeagus shortened, stiff, rod-like. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Nantou Co., Huisun. 20 Feb. 1990. C. S. Tseng, light trap. NMNS 629-7073. Det. by C. S. Lin.

24. *Orthotylus* sp. 2

Fig. 24

Left apical median margin of abdominal segment IX with a short process; extension differentiated. Apex of abdominal tergite IX 0.48 times width of widest portion; apical margin deeply emarginated. Sternite with more or less asymmetrical apex, acutely produced caudad slightly to left, armed with long setae. Abdominal segment X transverse. Abdominal segment XI not retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes moderately large. Support tube rather upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part elongate, lightly pigmented, not spiraled; apical part slender, spiraled. Sheath unrecognizable. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, ventral one large, plate-shaped; dorsal one fused with apical sclerotized portion of phallobase. Exposed phallobasal conjunctiva small, with 2 serrated processes. Aedeagus shortened, stiff, rod-like. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Nantou Co., Jenai Township, Chunyang. 10~12 Aug. 1998. C. S. Lin and W. T. Yang, mercury light. NMNS ENT. 2948-16. Det. by C. S. Lin.

25. *Excentricus planicornis* (Herrich-Schaeffer, 1836)

Fig. 25

Apex of abdominal tergite IX 0.50 times width of widest portion; apical margin shallowly emarginated. Sternite with symmetrical, truncated

apex. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates arched. Genital styles asymmetrical in shape and size, one on left slightly larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes moderately large. Support tube rather upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part rod-like, lightly pigmented, not spiraled; apical part slender, spiraled. Sheath short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, ventral one very large, tube-shaped at base. Exposed phallobasal conjunctiva small, with 2 serrated processes, dorsal process branched into 5 branches at apex; lower one 2-branched. Aedeagus shortened. Gonopore difficult to recognize.

Specimen examined: 1 male. China: Hanglon R.. 9 Aug. 1984. Chen.

26. *Mecomma capitata* Liu et Zheng 1993

Fig. 26

Apex of abdominal tergite IX 0.47 times width of widest portion; apical margin strongly emarginated. Sternite with asymmetrical apex, left laterocaudal portion obliquely straightened. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left slightly larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes moderately large. Support tube somewhat upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part converging to apex, heavily pigmented, not spiraled; apical part slender, spiraled. Sheath undifferentiated. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, ventral one tube-shaped. Exposed phallobasal conjunctiva small, with a long, pigmented process, branched subapically. Aedeagus shortened, slightly arched at apex. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Nantou Co., Jenai Township, Aowanda. 30 Apr. 1992. W. T. Yang, sweep net. 1448-226. Det. by C. S. Lin

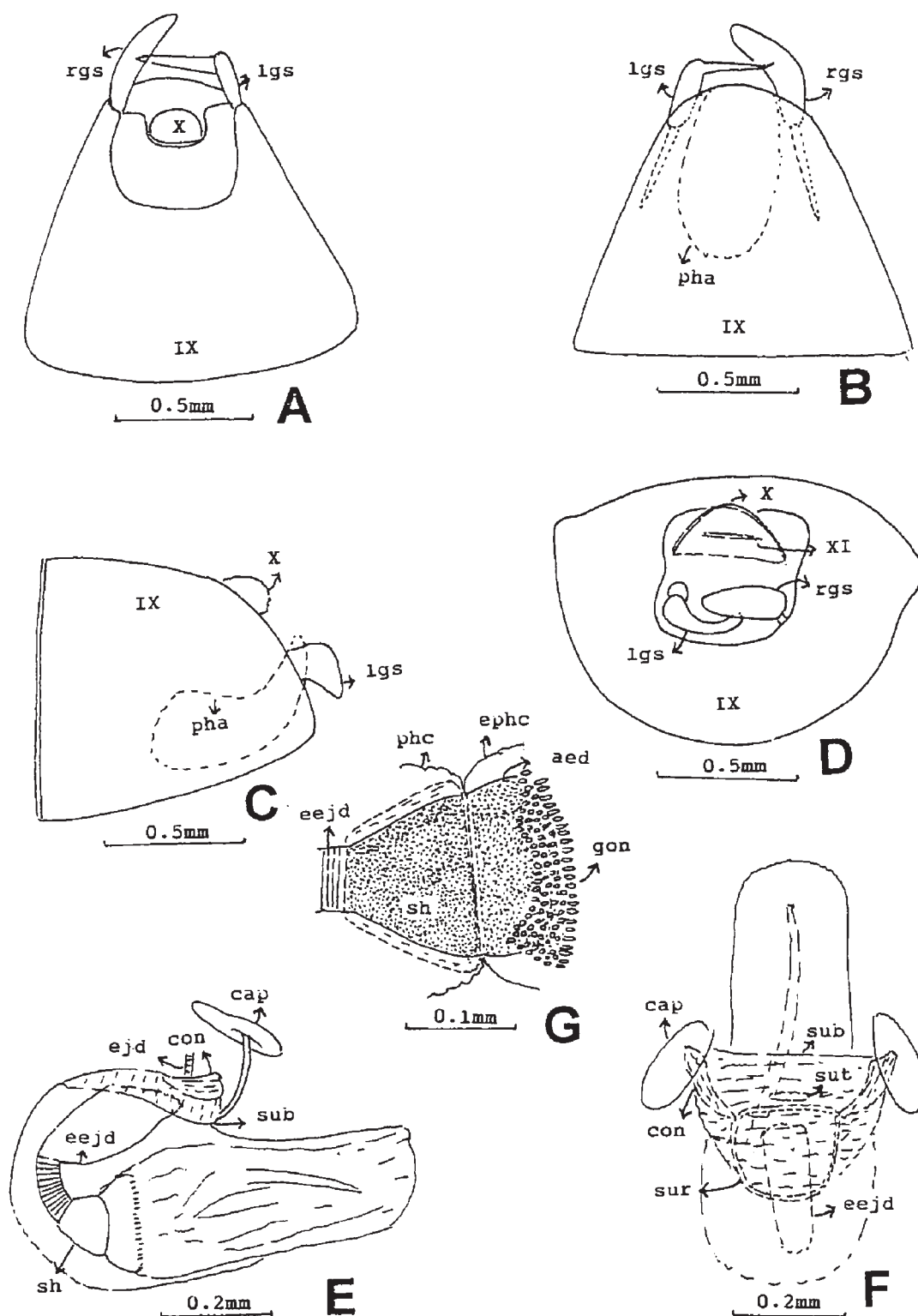


Fig. 16. *Orthocephalus funestus*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. sheath and aedeagus, lateral view.

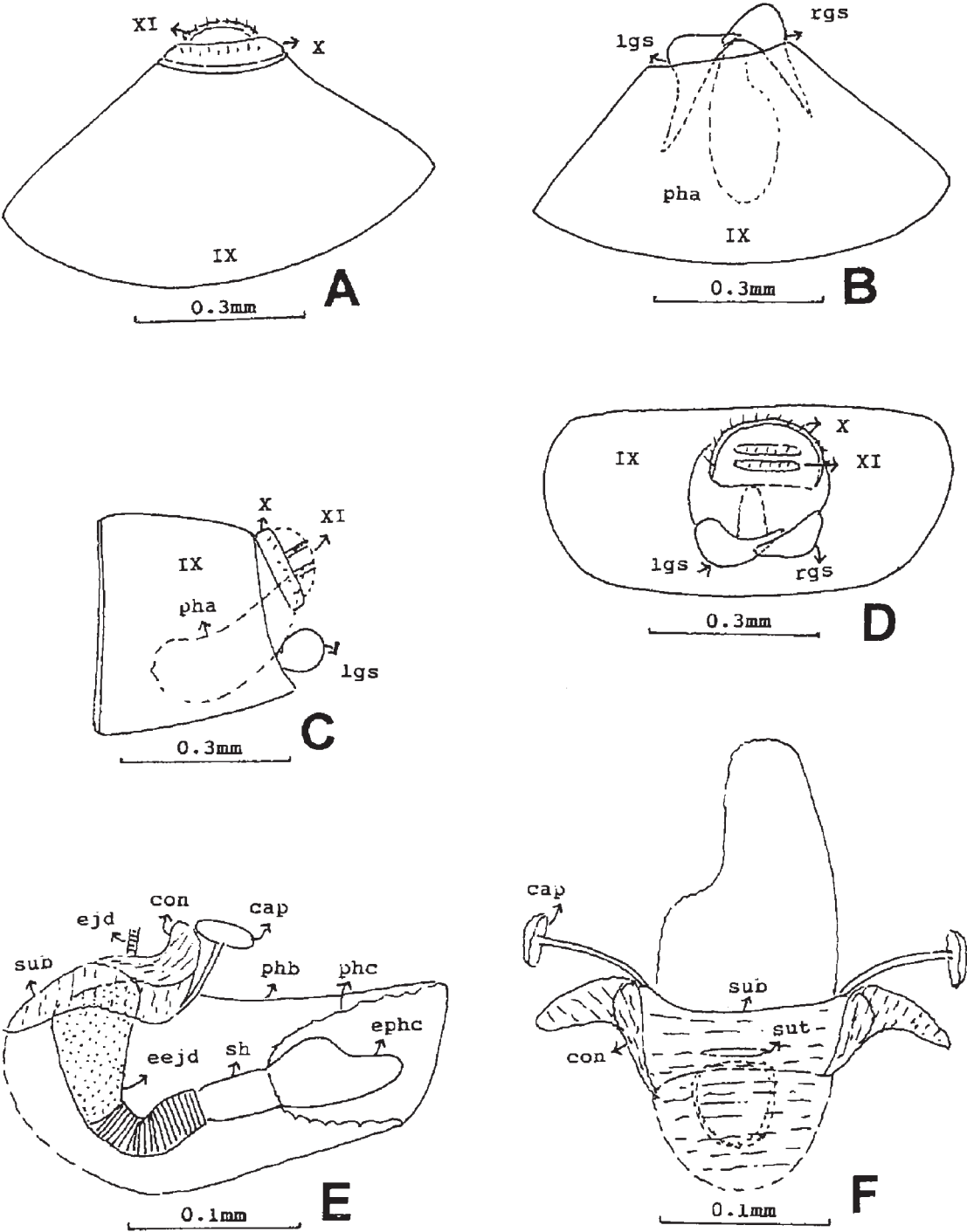


Fig. 17. *Halticus bractatus*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view.

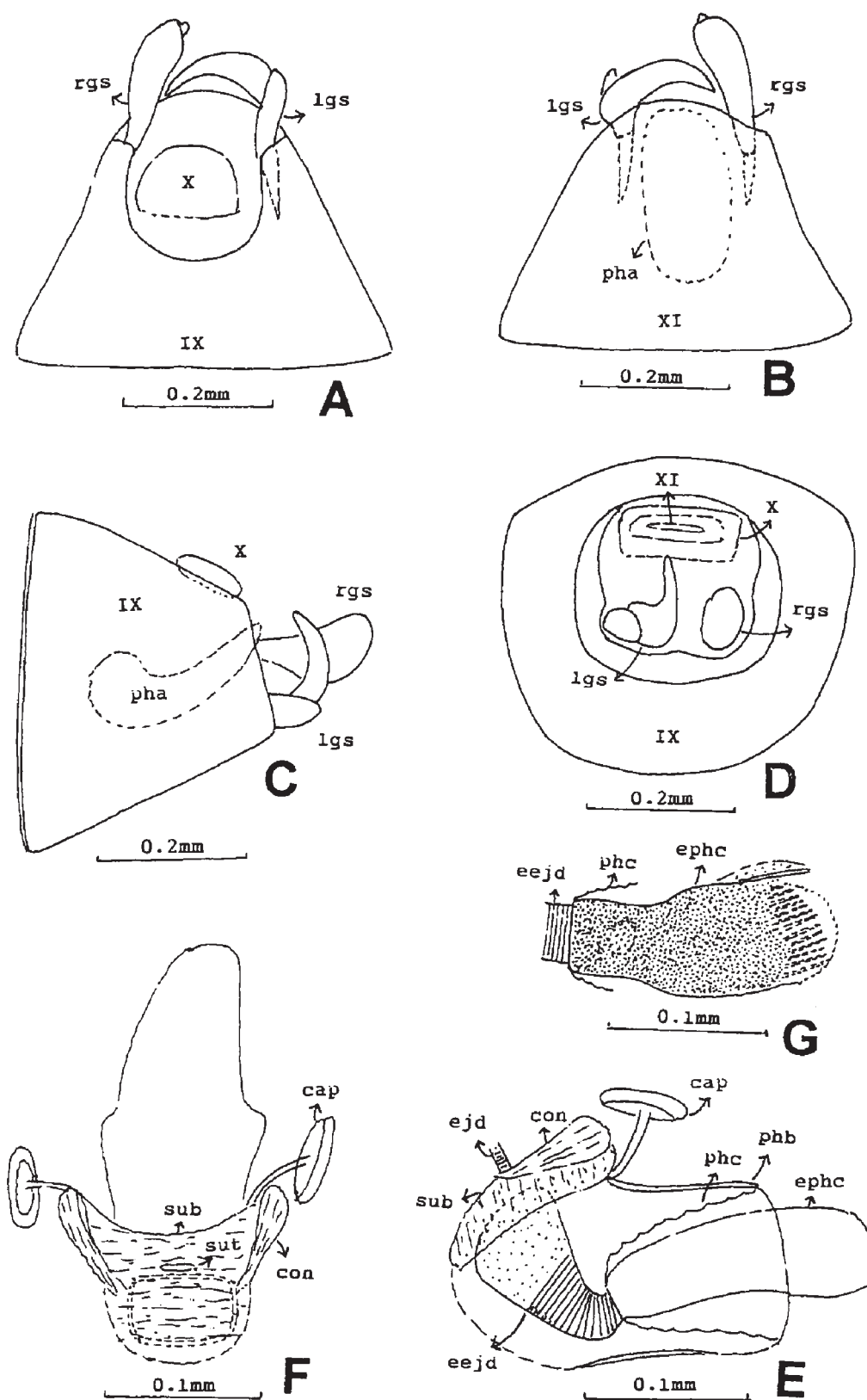


Fig. 18. *Halticus tibialis*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. exposed phallobasal conjunctiva, lateral view.

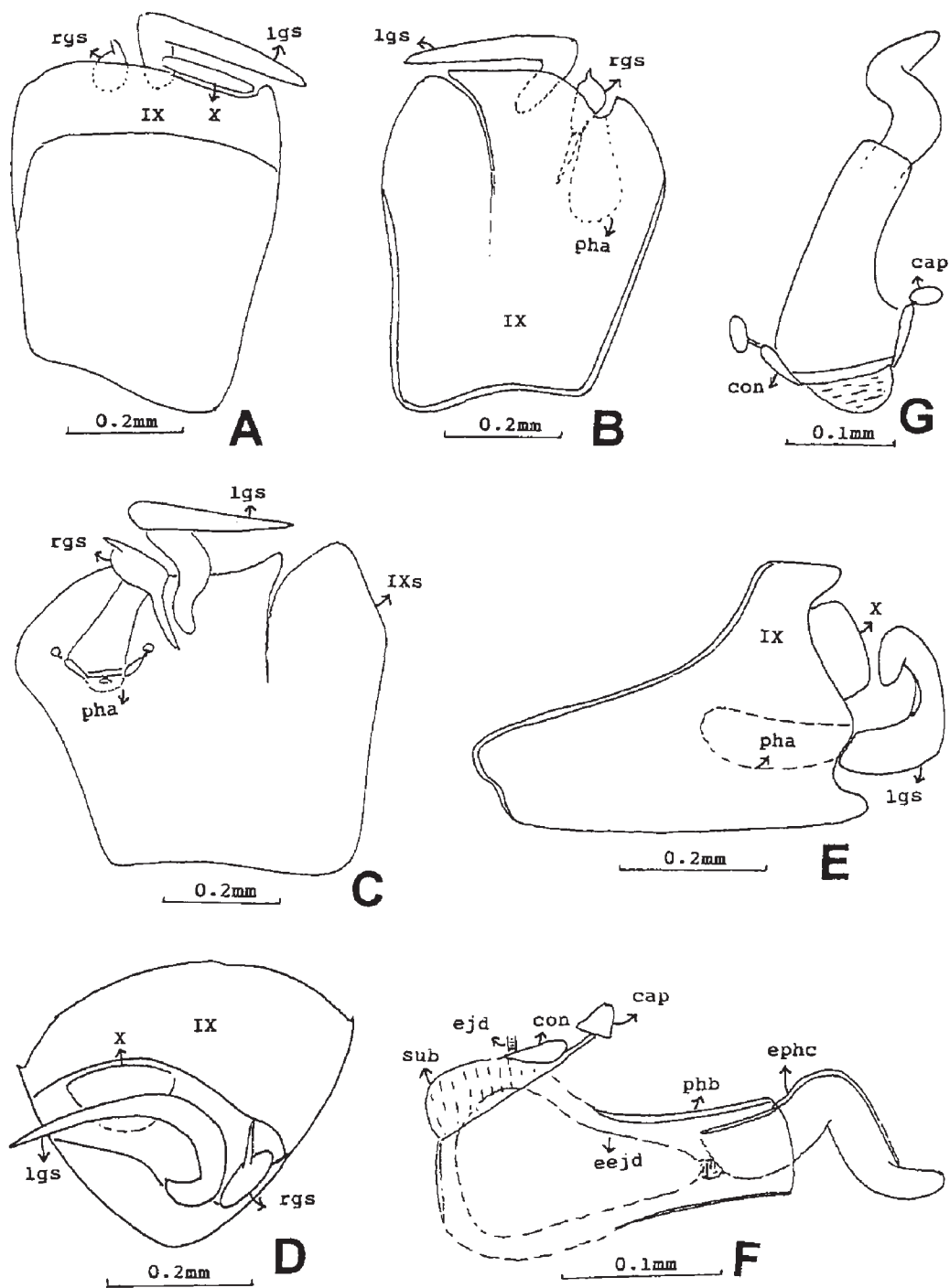


Fig. 19. *Coriodromis chinensis*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. abdominal sternite IX, phallus, and genital styles, ventral view; D. abdominal segments IX and X and genital styles, caudal view; E. the same, lateral view; F. phallus, lateral view.

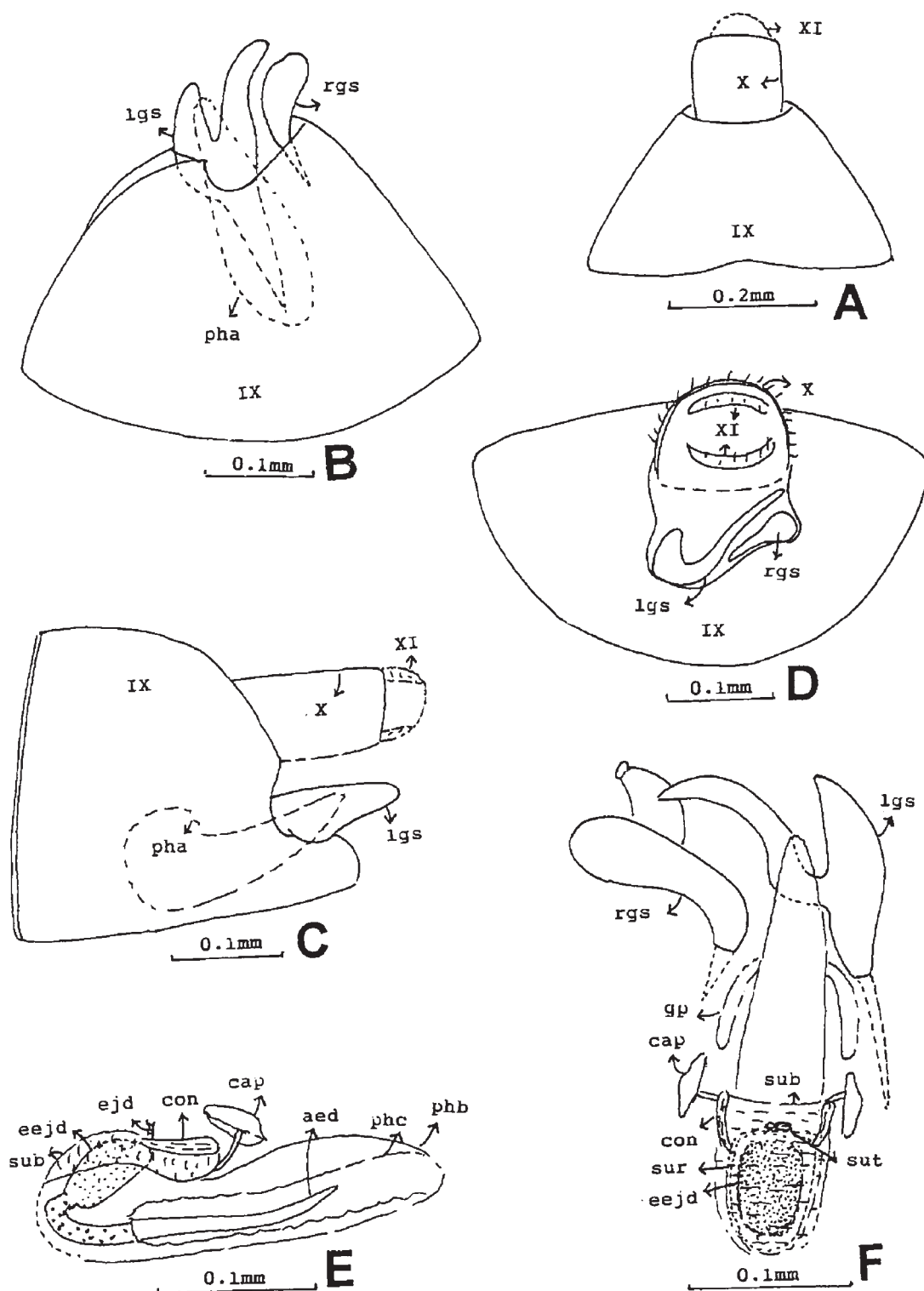


Fig. 20. *Cyrtorhinus lividipennis*. A. Abdominal segments IX-XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. phallus, genital plates and genital styles, dorsal view.

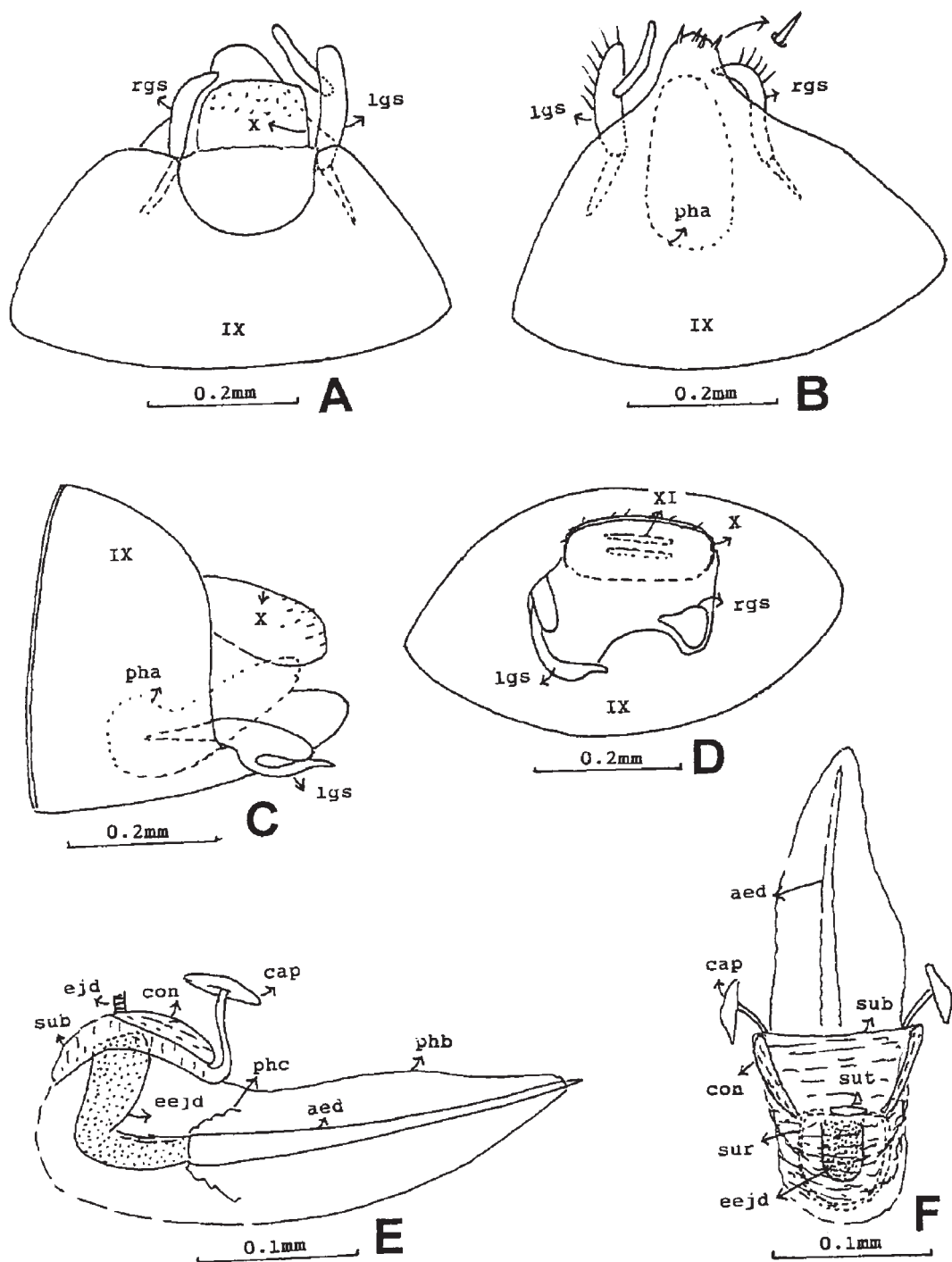


Fig. 21. *Pseudoloxops lateralis*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view.

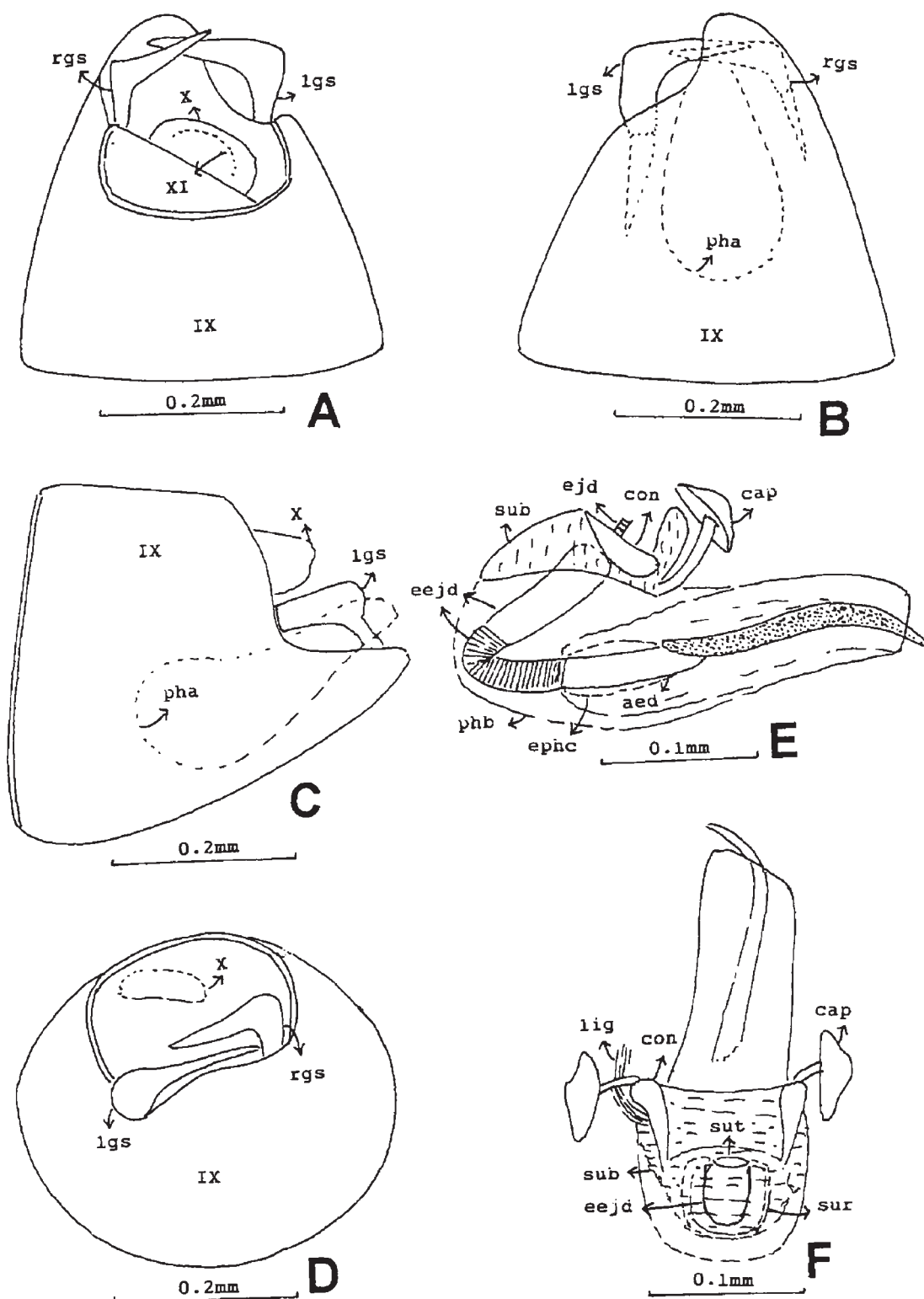


Fig. 22. *Latizanchius viridivittatus*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, ventral view.

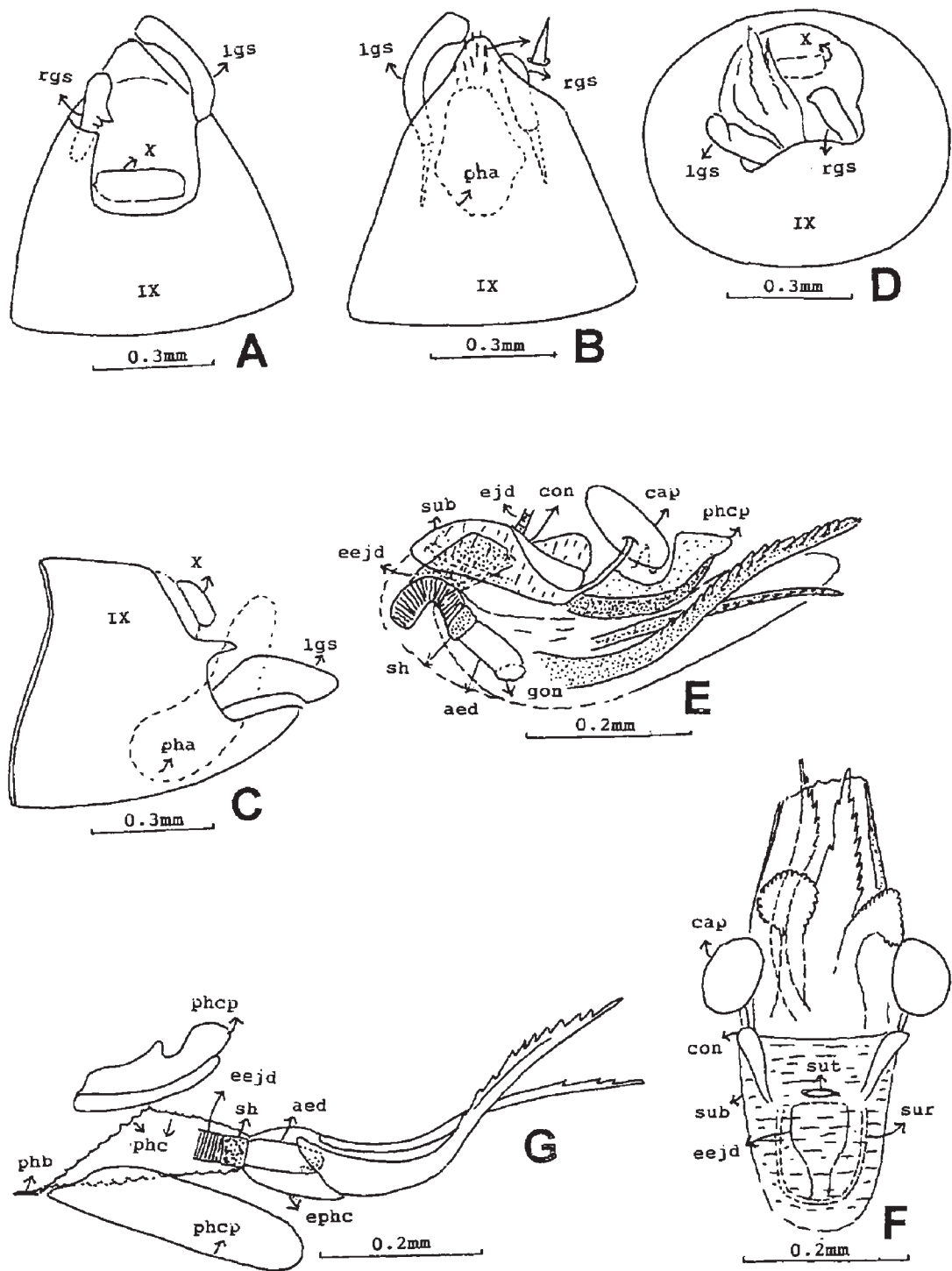


Fig. 23. *Orthotylus* sp. 1. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. aedeagus in complete eversion, lateral view.

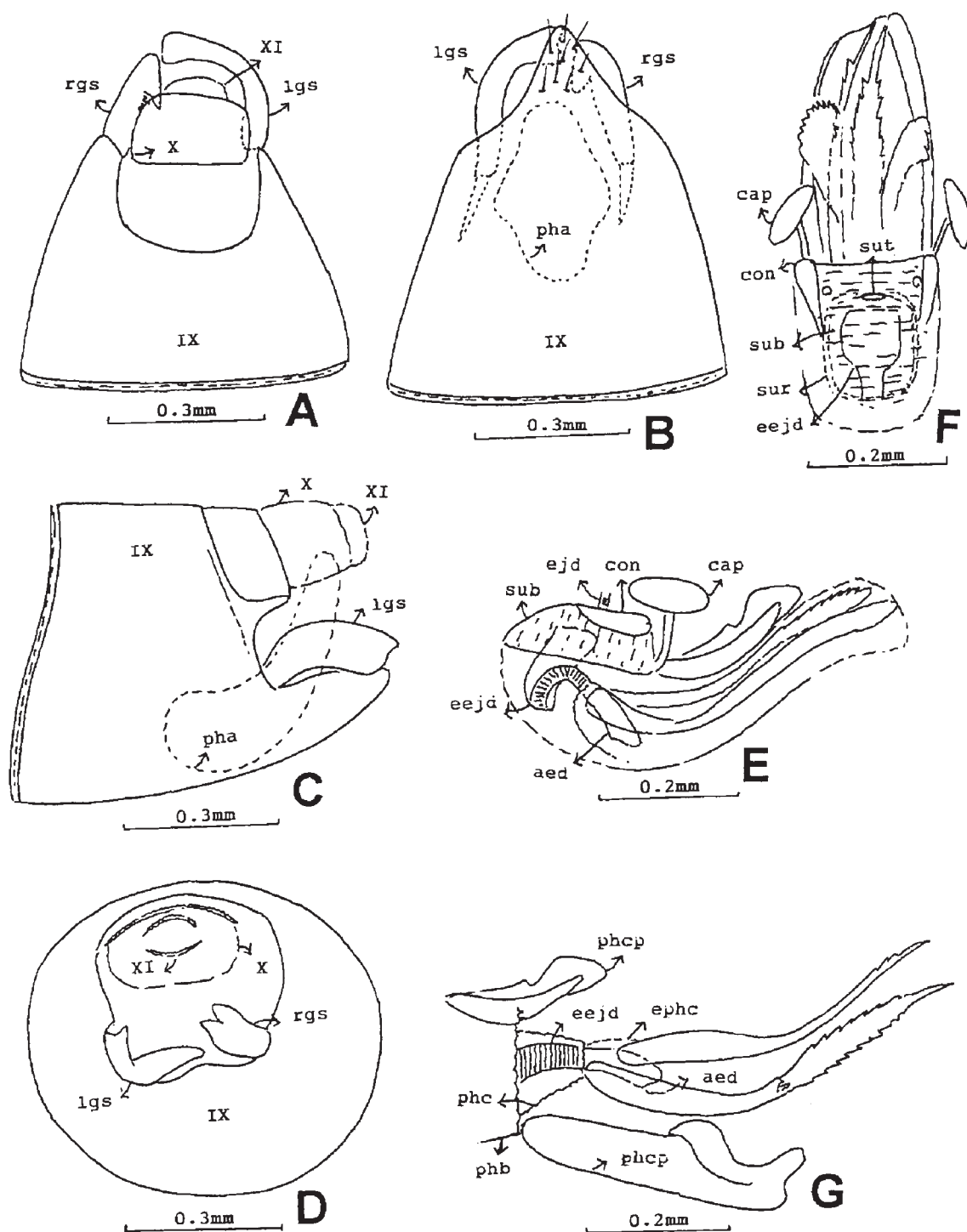


Fig. 24. *Orthotylus* sp. 2. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. aedeagus, in complete eversion, lateral view.

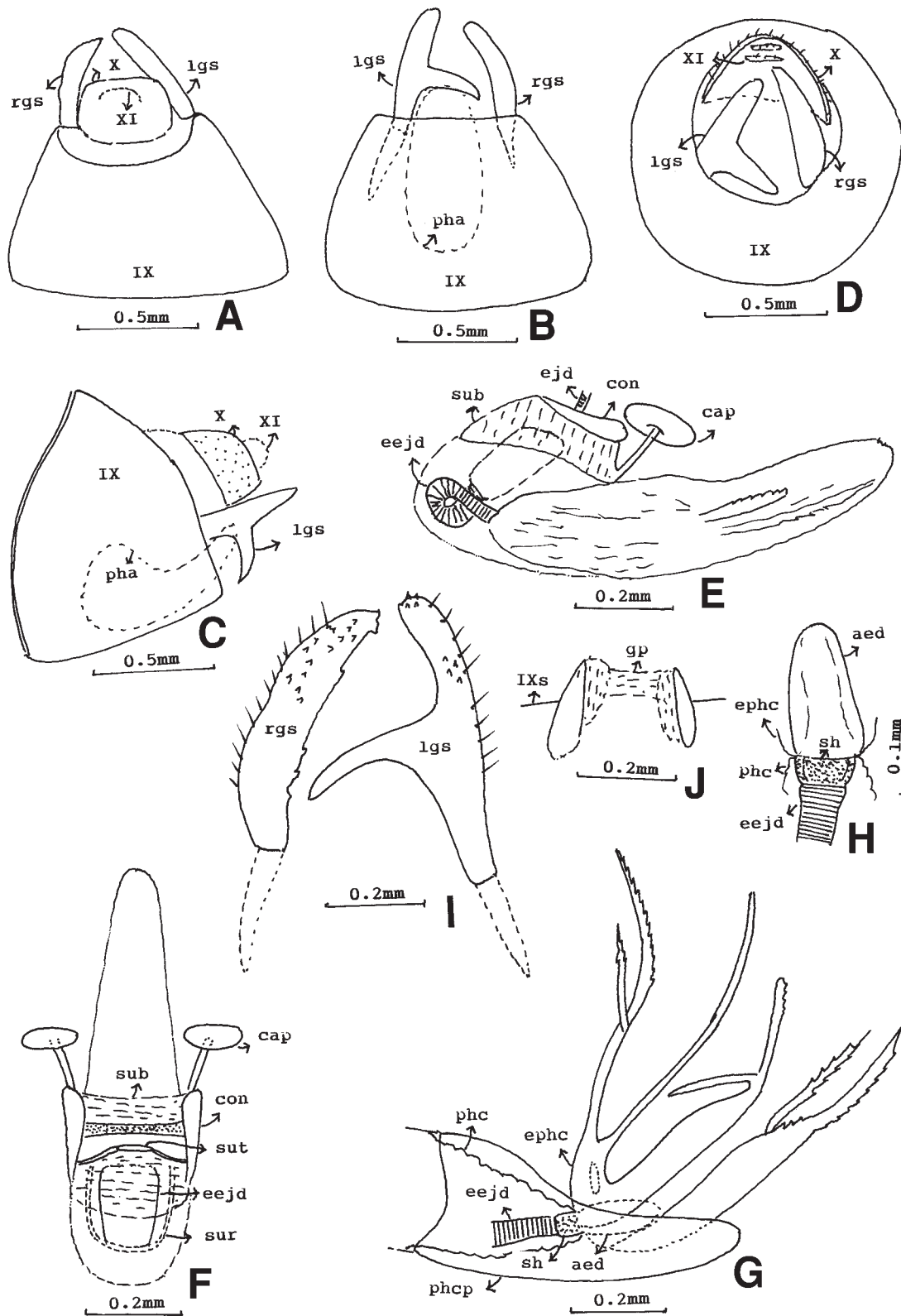


Fig. 25. *Excentricus planicornis*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. aedeagus in complete eversion, lateral view; H. aedeagus and sheath, dorsal view; I. genital styles, dorsal view; J. genital plates, dorsal view.

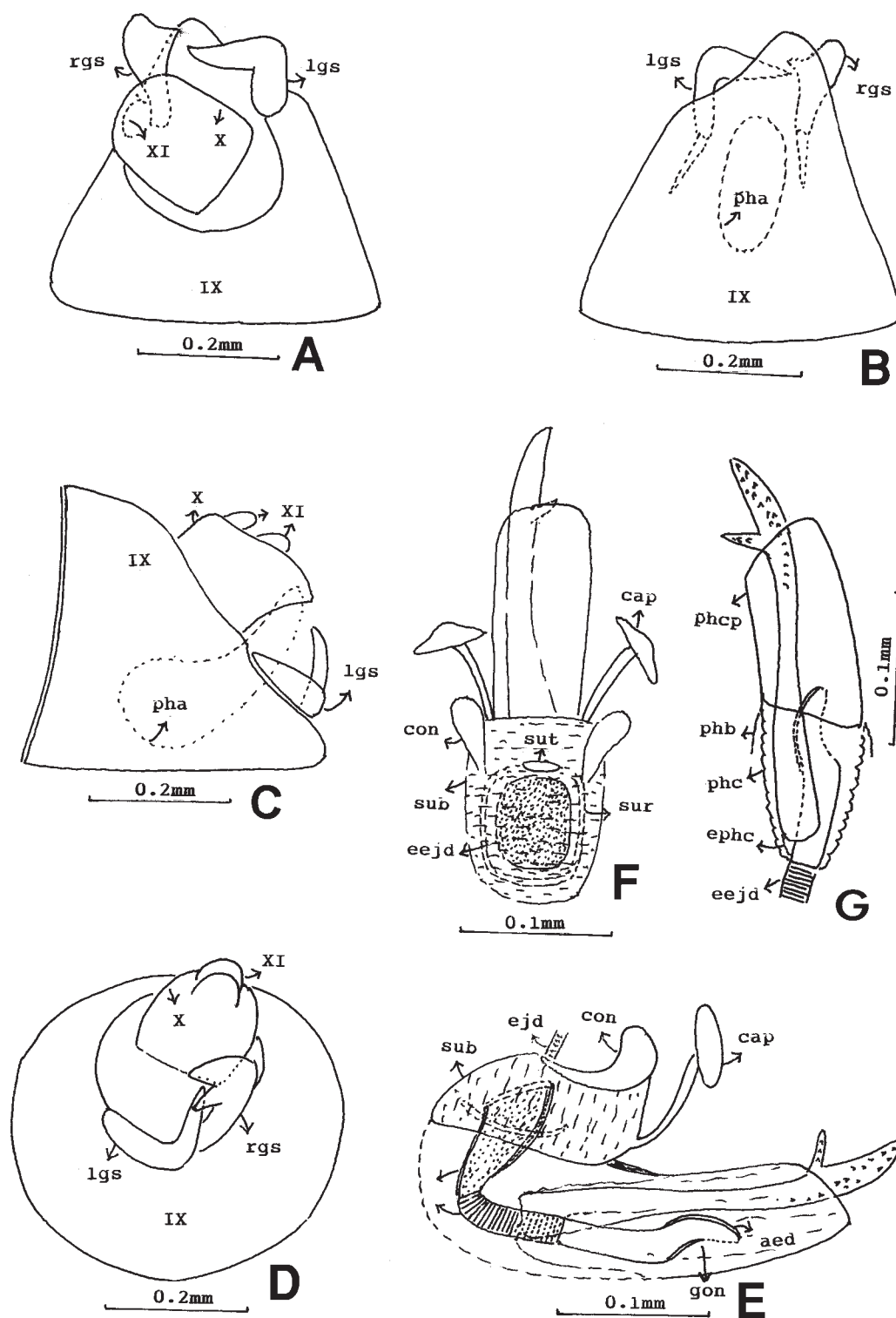


Fig. 26. *Mecomma capitata*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. aedeagus in complete eversion, lateral view.

27. *Mecomma opaca* Liu et Zheng, 1993
Fig. 27

Apex of abdominal tergite IX 0.40 times width of widest portion; apical margin strongly emarginated. Sternite with asymmetrical apex, left laterocaudal portion shallowly emarginated. Abdominal segment X transverse. Abdominal segment XI not retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left somewhat larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes moderately large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part rather small, heavily pigmented, not spiraled; apical part slender, spiraled. Sheath undifferentiated. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, ventral one tube-shaped. Exposed phallobasal conjunctiva small, with a long, pigmented process, branched subapically. Aedeagus shortened, slightly convex ventral to apex. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Nantou Co., Jenai Township, Aowanda. 30 June 1992. W. T. Yang, sweep net. 1448-76. Det. by C. S. Lin.

28. *Zanchius apicalis* Poppius, 1915
Fig. 28

Apex of abdominal tergite IX 0.56 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, median portion unequally produced caudad. Abdominal segment X elongate. Abdominal segment XI not retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes moderately large. Support tube upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part lightly pigmented, not spiraled; apical part slender, spiraled. Sheath short. Both phallobase and phallobasal conjunctiva judged to be shortened. Phallobasal conjunctival processes exposed in genital chamber, ventral one judged to be united into tube-shaped structure. Exposed phallobasal conjunctiva large, partly exposed in genital chamber, apex with pigmented cone-shaped

structure, inner side with 2 processes, one of them branched at apex. Aedeagus shortened, rod-like. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Pingtung Co., Eluanpi. 27 June 1981. T. Lin and C. C. Pan. Det. by C. S. Lin.

29. *Pseudoloxopidea* sp.
Fig. 29

Abdominal segment IX with a small process at left lateroapical angle. Apex of abdominal tergite IX 0.53 times width of widest portion; apical margin deeply emarginated. Sternite with asymmetrical apex. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left somewhat larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes large. Support tube upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part elongate quadrate, heavily pigmented, not spiraled; apical part slender, spiraled. Sheath quadrate. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, ventral one tube-shaped. Exposed phallobasal conjunctiva large, bilobed, each lobe pigmented at apex. Aedeagus shortened. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Nantou Co., Huisun. 20 Feb. 1999. C. S. Tseng, light trap. NMNS ENT. 629-7303. Det. by C. S. Lin.

Remarks on Description of the Orthotylinae

Abdominal segment IX with completely fused tergite and sternite; not dorsoventrally elongate quadrate in lateral view; its posterior opening not directed ventrocaudad; its anterior margin with undifferentiated extension; its surface either with or without a process. Abdominal segment X either transverse or elongate; directed either caudad or to right and laterocaudad; situated after abdominal tergite IX. Genital styles either asymmetrical in shape and size, one on left larger; or symmetrical in shape and size.

Connective with reduced transverse portion. Support bridge well developed; if winged, not directed cephalad. Capitae processes differentiated. Expanded ejaculatory duct either

separated into 2 parts; basal part variable in form, not spiraled; apical part spiraled; or not separated into 2 parts, not spiraled. Sheath either undifferentiated or differentiated. Neither phallobase nor phallobasal conjunctiva shortened or both only slightly shortened. Phallobasal conjunctival processes exposed in genital chamber either undifferentiated or differentiated. Exposed phallobasal conjunctiva either undifferentiated or differentiated. Aedeagus moderately either long, lengthened, shortened, or wholly reduced. Gonopore either difficult to recognize or wholly reduced.

V. Subfamily Phylinae

(8) Auricillocorini

30. *Wygomiris* sp.

Fig. 30

Apex of abdominal tergite IX 0.30 times width of widest portion; apical margin moderately emarginated. Sternite with symmetrical apex, broadly produced caudad, rounded. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Left genital style [lost/missing?].

Phallus C-shaped within segment IX. Connective with reduced transverse portion. Support bridge well developed, median portion narrowly produced caudad in dorsal view. Capitae processes small. Support tube extremely upraised. Expanded ejaculatory duct not separated into 2 parts; lightly pigmented, not spiraled. Phallobase and phallobasal conjunctiva judged not to be shortened. Phallobase with sclerotized apical portion. Exposed phallobasal conjunctiva undifferentiated. Aedeagus lengthened, stiff, cylindrical, apical 1/2 expanded, then converging to apex. Gonopore defined, with transverse ridges, elongate.

Specimen examined: 1 male. Taiwan: Nantou Co., Huisun. 20 Feb. 1990. S. C. Tseng, light trap. NMNS 629-6703. Det. by C. S. Lin.

(9) Tribe Pilophorini

31. *Pilophorus formosanus* Poppius, 1914

Fig. 31

Apex of abdominal tergite IX 0.32 times width of widest portion; apical margin deeply

emarginated. Sternite with seemingly symmetrical apex. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped; angulated > 90° ventrally. Support bridge somewhat well developed, slender in lateral view. Capitae processes comparatively large. Support tube rather upraised. Expanded ejaculatory duct not separated into 2 parts, lightly pigmented, not spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Aedeagus lengthened, L-shaped, stiff, not extending over apex of phallobase. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Hsinchu Co., Wufeng. 14~16 July 1982. K. C. Chou and C. C. Pan. Det. by C. S. Lin.

32. *Pilophorus typicus* (Distant, 1909)

Fig. 32

Apex of abdominal tergite IX 0.28 times width of widest portion; apical margin deeply emarginated. Sternite with symmetrical apex, roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed, short triangular, as wide as long in lateral view. Capitae processes moderately large. Support tube rather upraised. Support ring subquadrate in dorsal view. Expanded ejaculatory duct not separated into 2 parts, heavily pigmented, not spiraled. Sheath undifferentiated. Neither phallobase nor phallobasal conjunctiva shortened. Phallobase with sclerotized apical portion. Aedeagus lengthened, stiff, cylindrical, L-shaped, not extending over apex of phallobase; dorsal aspect of apical 1/3 with a branched process. Gonopore defined, with transverse ridges which are not really situated above gonopore. Gonopore subterminal.

Specimen examined: 1 male. Taiwan: Taitung Co., 9~11 Nov. 1982. K. C. Chou and S. P. Huang. Det. by C. S. Lin.

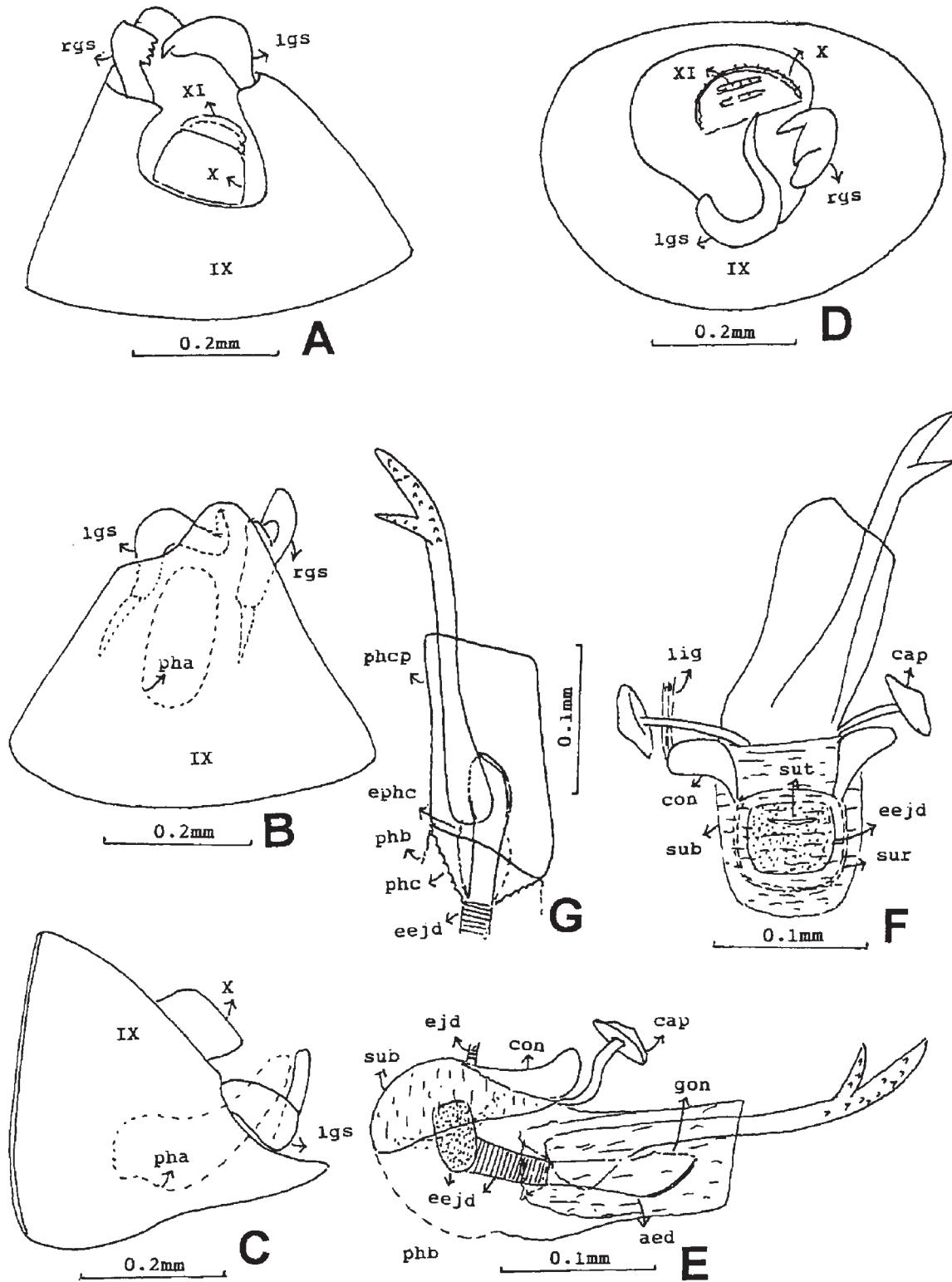


Fig. 27. *Mecomma opaca*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. aedeagus in complete eversion, lateral view.

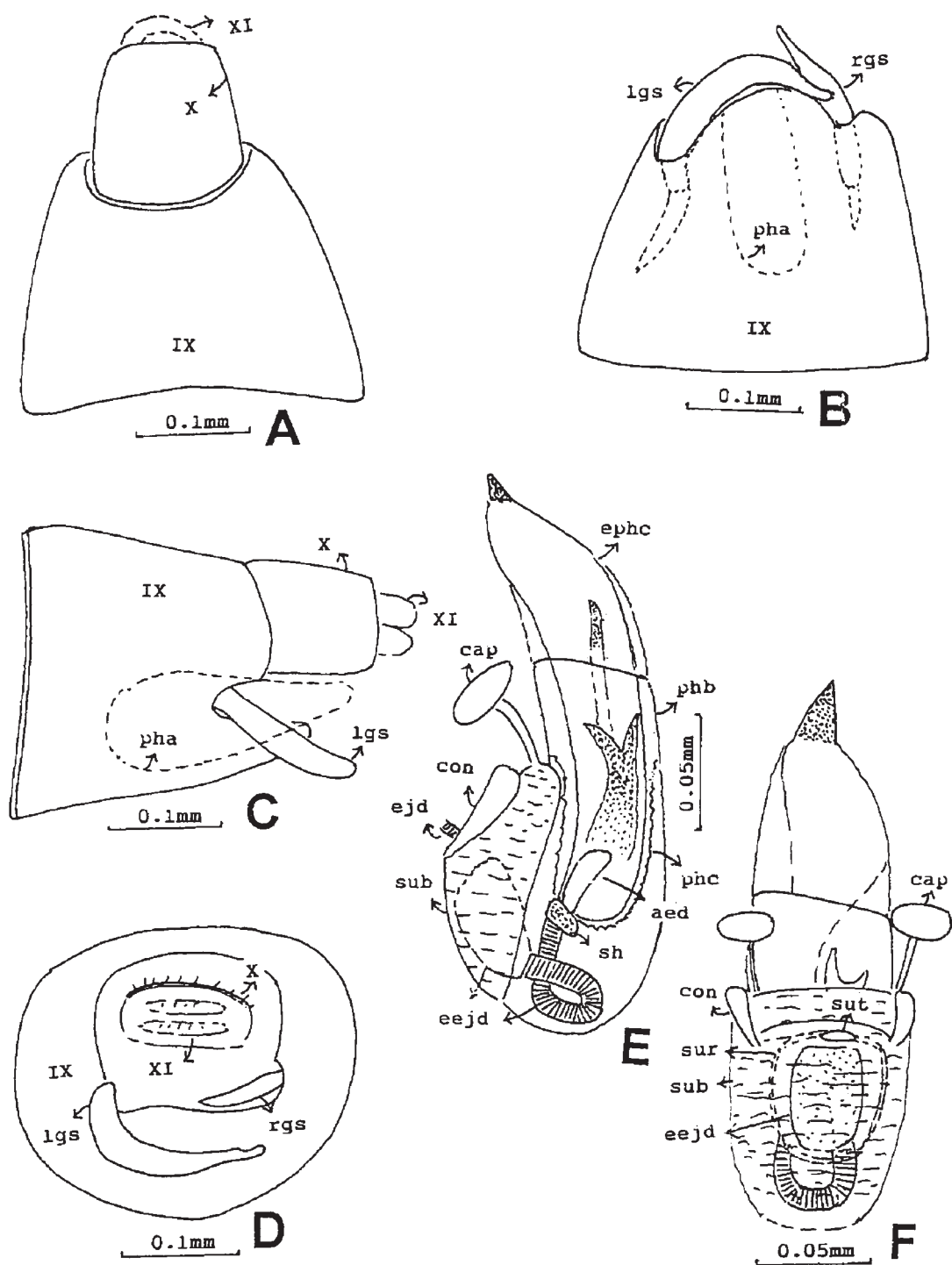


Fig. 28. *Zanchius apicalis*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view.

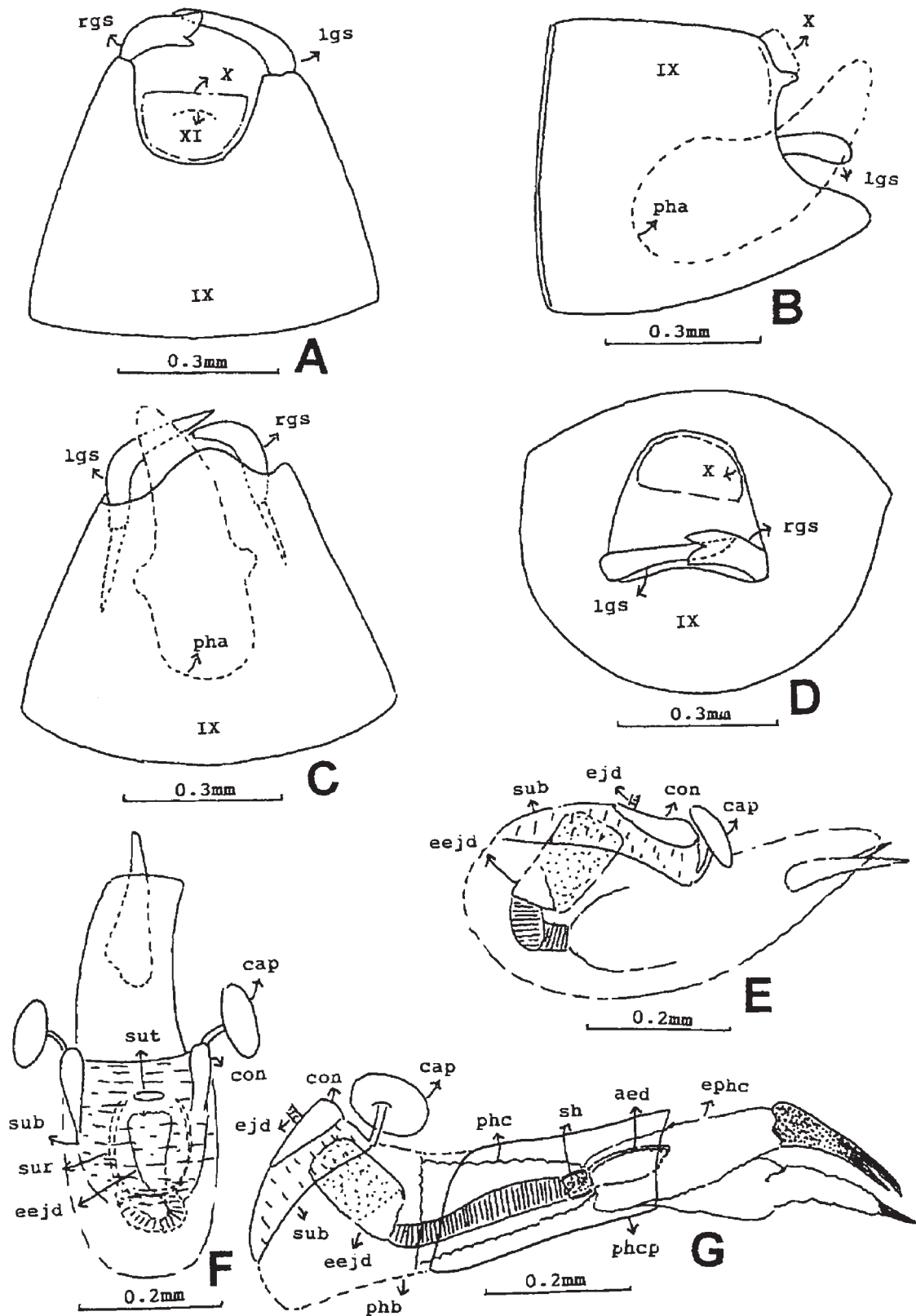


Fig. 29. *Pseudoxopidea* sp. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, lateral view; C. the same, ventral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. aedeagus in complete eversion, lateral view.

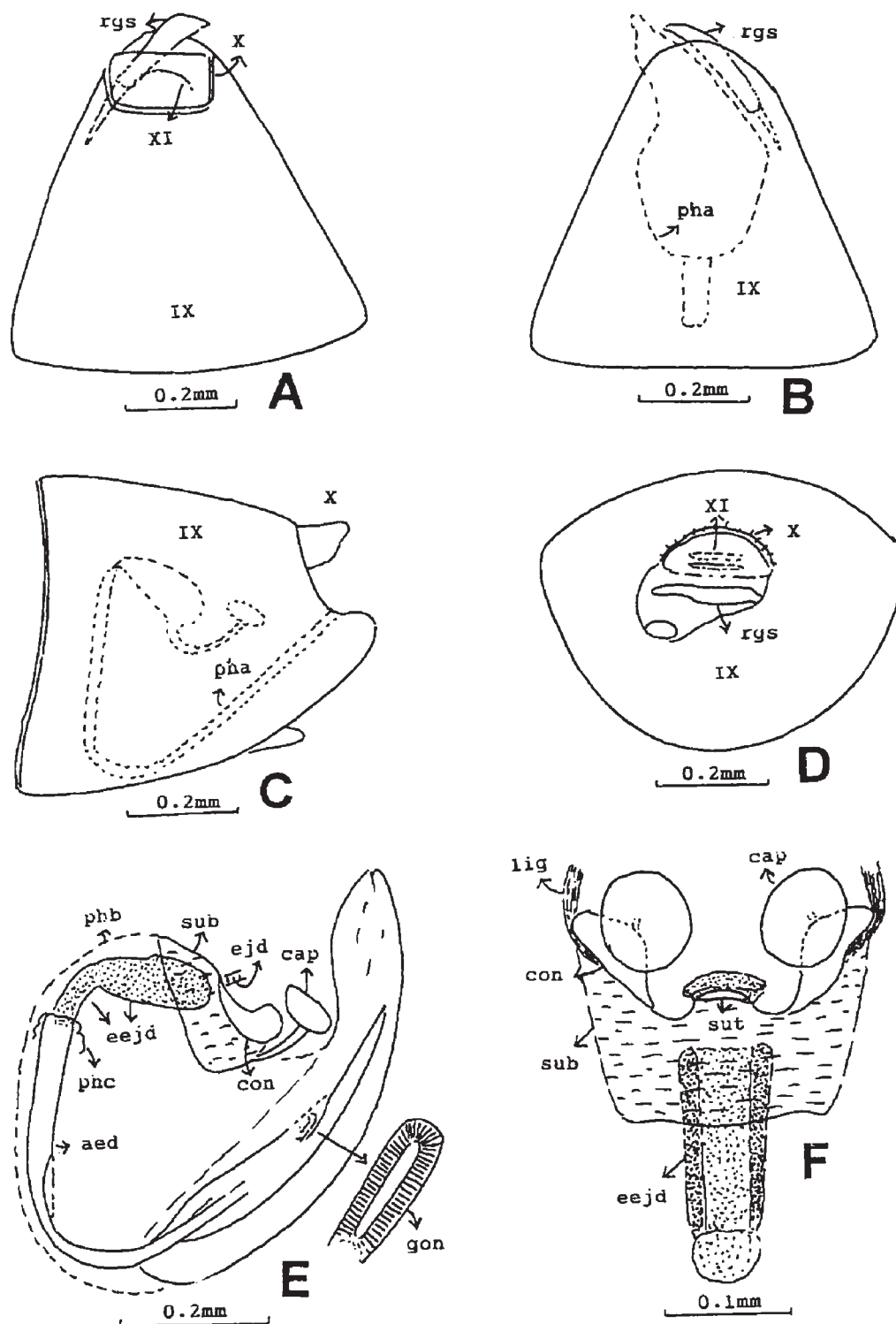


Fig. 30. *Wygomiris* sp. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. support bridge, support tube, and expanded ejaculatory duct, dorsal view.

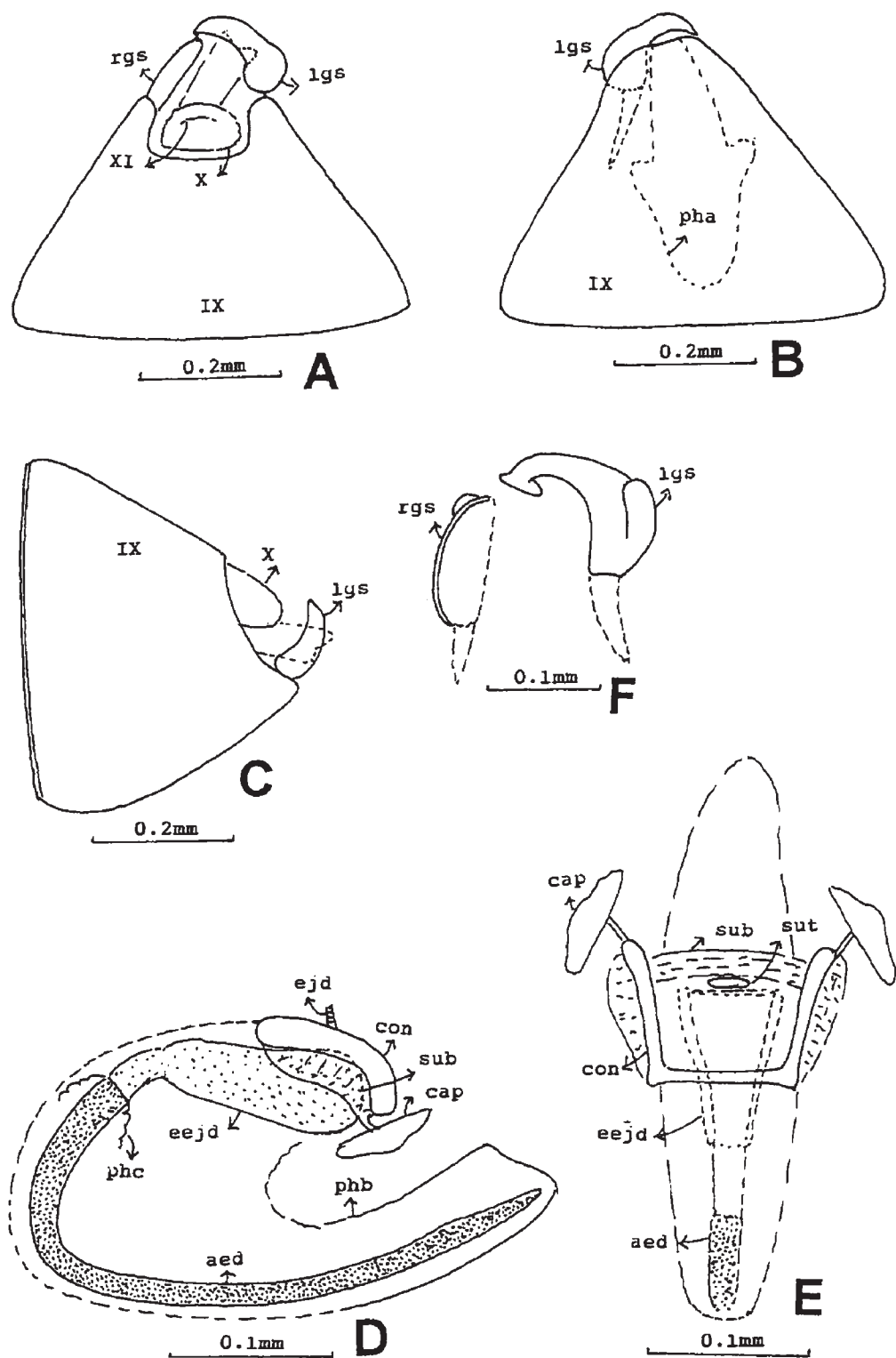


Fig. 31. *Pilophorus formosanus*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same ventral view; C. the same, lateral view; D. phallus, lateral view; E. the same, dorsal view; F. genital styles, dorsal view.

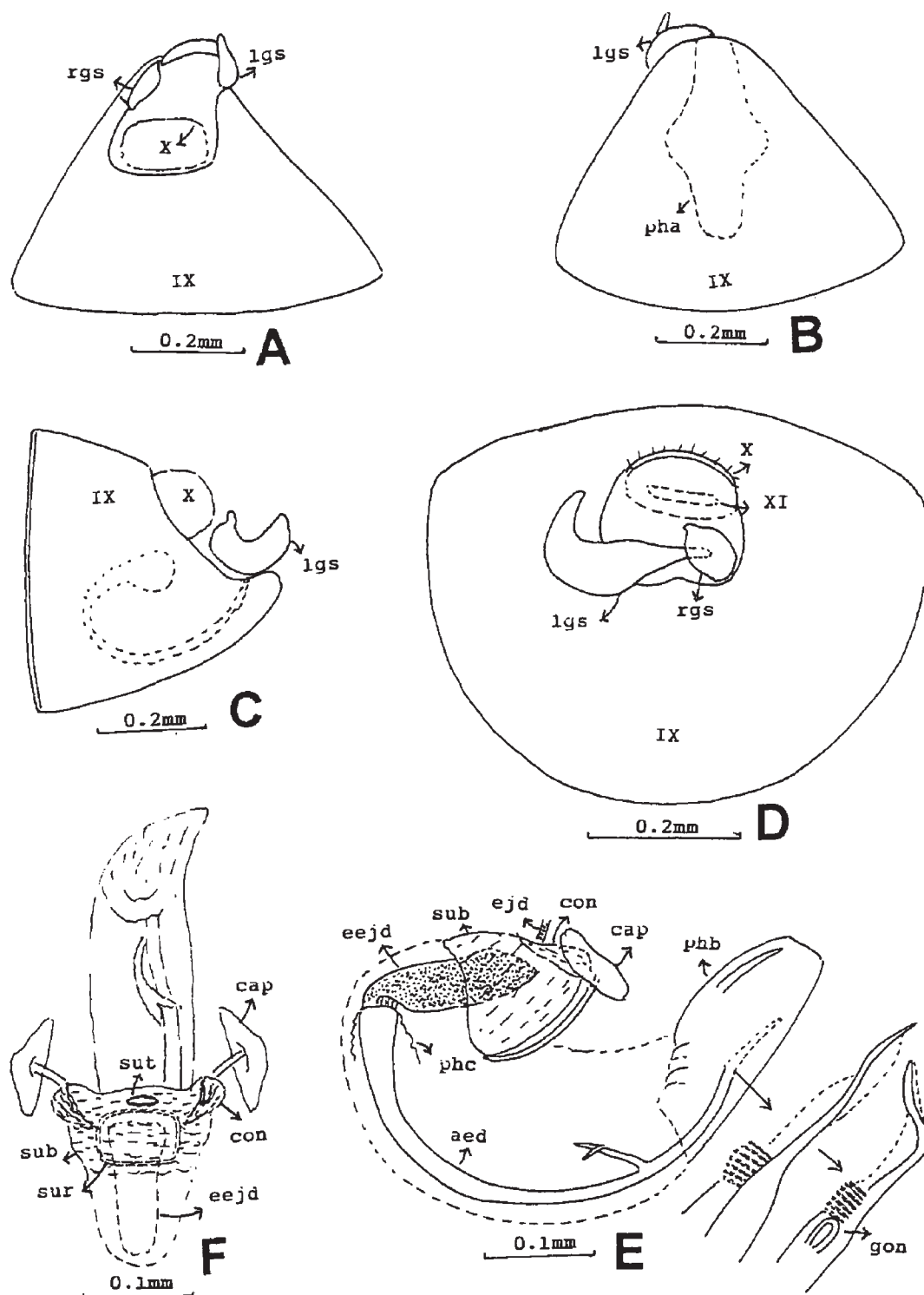


Fig. 32. *Pilophorus typicus*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view.

33. *Hypselocus morobe* (Schuh, 1984)
Fig. 33

Apex of abdominal tergite IX 0.37 times width of widest portion; apical margin deeply emarginated. Sternite with symmetrical apex, roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI not examined. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed, short, as wide as long in lateral view. Capitae processes moderately large. Support tube rather upraised. Support ring quadrate in dorsal view. Expanded ejaculatory duct not separated into 2 parts, heavily pigmented, not spiraled. Sheath undifferentiated. Neither phallobase nor phallobasal conjunctiva shortened. Phallobase with sclerotized apical portion. Aedeagus lengthened, stiff, cylindrical, L-shaped, dorsal aspect of apical 1/3 with a simple process. Gonopore defined, subterminal.

Specimen examined: 1 male. Taiwan: Nantou Co., Lienhuachih. June 1982. K. C. Chou and C. C. Pan. Det. C. S. Lin.

34. *Pilophorus myrmecoides* (Carvalho, 1956)
Fig. 34

Apex of abdominal tergite IX 0.38 times width of widest portion; apical margin deeply emarginated. Sternite with symmetrical apex, broad, roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed, short, as long as wide in lateral view. Capitae processes moderately large. Support tube rather upraised. Support ring quadrate in dorsal view. Expanded ejaculatory duct not separated into 2 parts, lightly pigmented, not spiraled. Sheath undifferentiated. Neither phallobase nor phallobasal conjunctiva shortened. Aedeagus lengthened, stiff, cylindrical, L-shaped. Gonopore defined, subterminal.

Specimen examined: 1 male. Taiwan: Pingtung Co., Junting. 25~28 May 1982. K. C. Chou and C. C. Pan. Det. by C. S. Lin.

(10) Tribe Phylini

35. *Campylomma livida* Reuter, 1885
Fig. 35

Left median and left lateroapical portions of abdominal segment IX with cone-shaped processes. Apex of abdominal tergite IX equal to width of widest portion; apical margin shallowly emarginated. Sternite with symmetrical apex, broad, roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge poorly developed. Capitae processes rather small. Support tube not upraised. Expanded ejaculatory duct not separated into 2 parts, lightly pigmented, not spiraled. Sheath undifferentiated. Neither phallobase nor phallobasal conjunctiva shortened. Phallobase with sclerotized apical portion. Aedeagus lengthened, S-shaped, partly membranous, not extending over apex of phallobase. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Pingtung Co., Liuchiu I. 22~23 Mar. 1982. K. C. Chou and C. C. Pan. Det. by C. S. Lin.

36. *Campylomma marjorae* Schuh, 1984
Fig. 36

Apex of abdominal tergite IX 0.40 times width of widest portion; apical margin deeply emarginated. Sternite with symmetrical apex, roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment XI. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes rather small. Support tube rather upraised. Support ring ring-like. Expanded ejaculatory duct not separated into 2 parts, lightly pigmented, not spiraled. Sheath undifferentiated. Neither phallobase nor phallobasal conjunctiva shortened. Phallobase with sclerotized apical portion. Aedeagus lengthened, S-shaped, partly membranous, not extending over apex of phallobase. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Pingtung Co., Shantimen. 16~20 Jan. 1984. K. C. Chou and C. C. Pan. Det. by C. S. Lin.

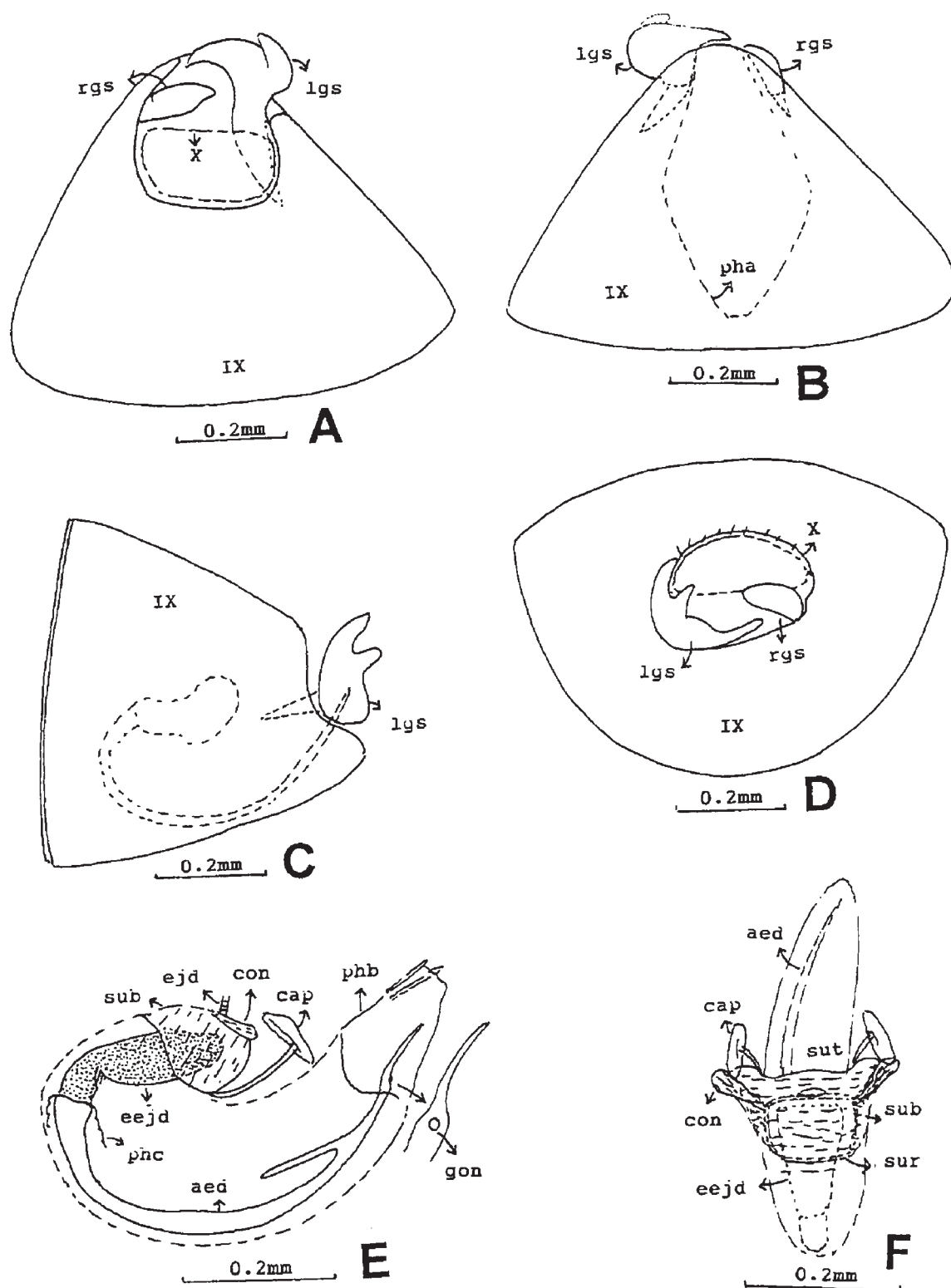


Fig. 33. *Hypselocus morobe*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view.

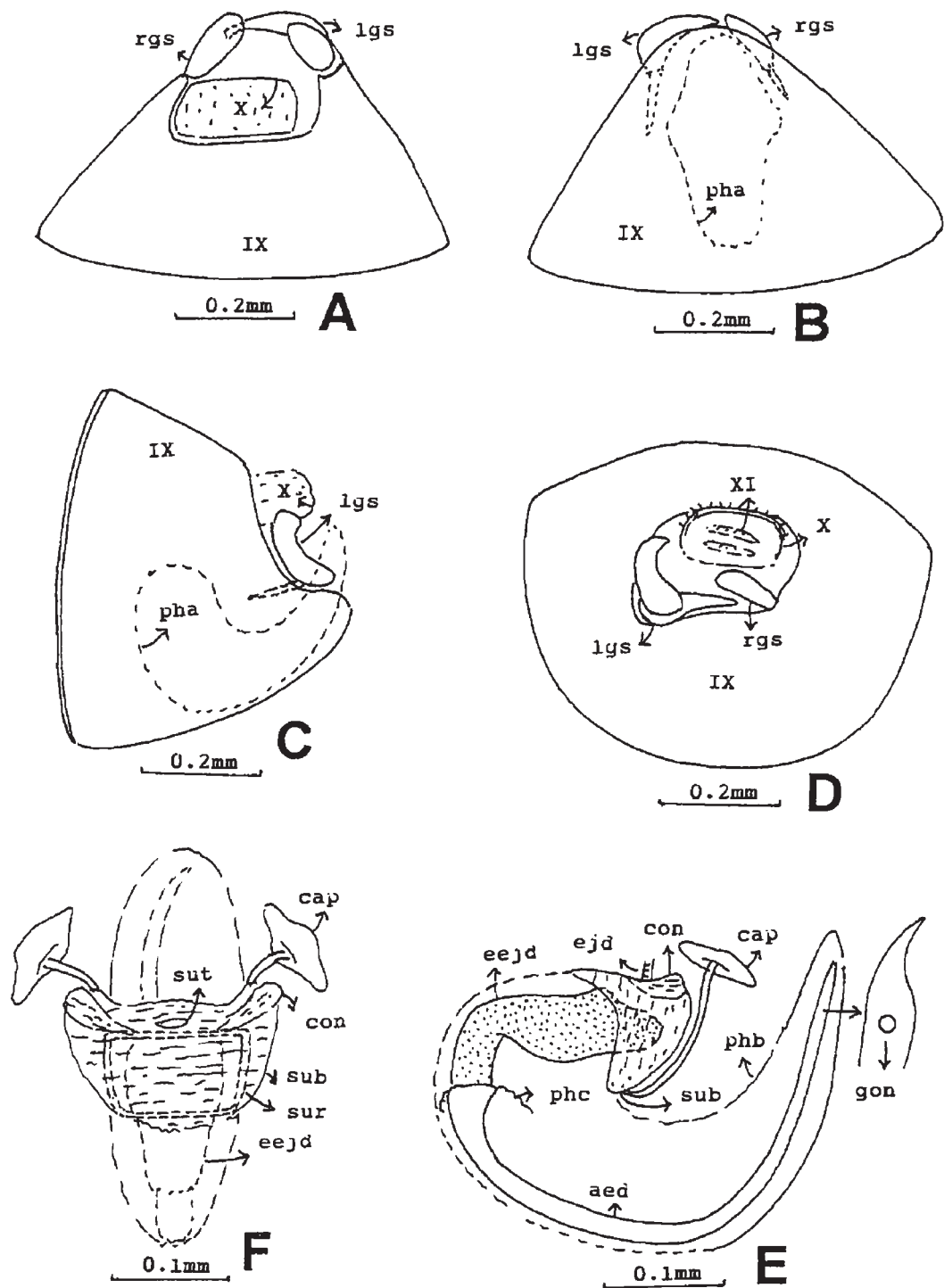


Fig. 34. *Pilophorus myrmecoides*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view.

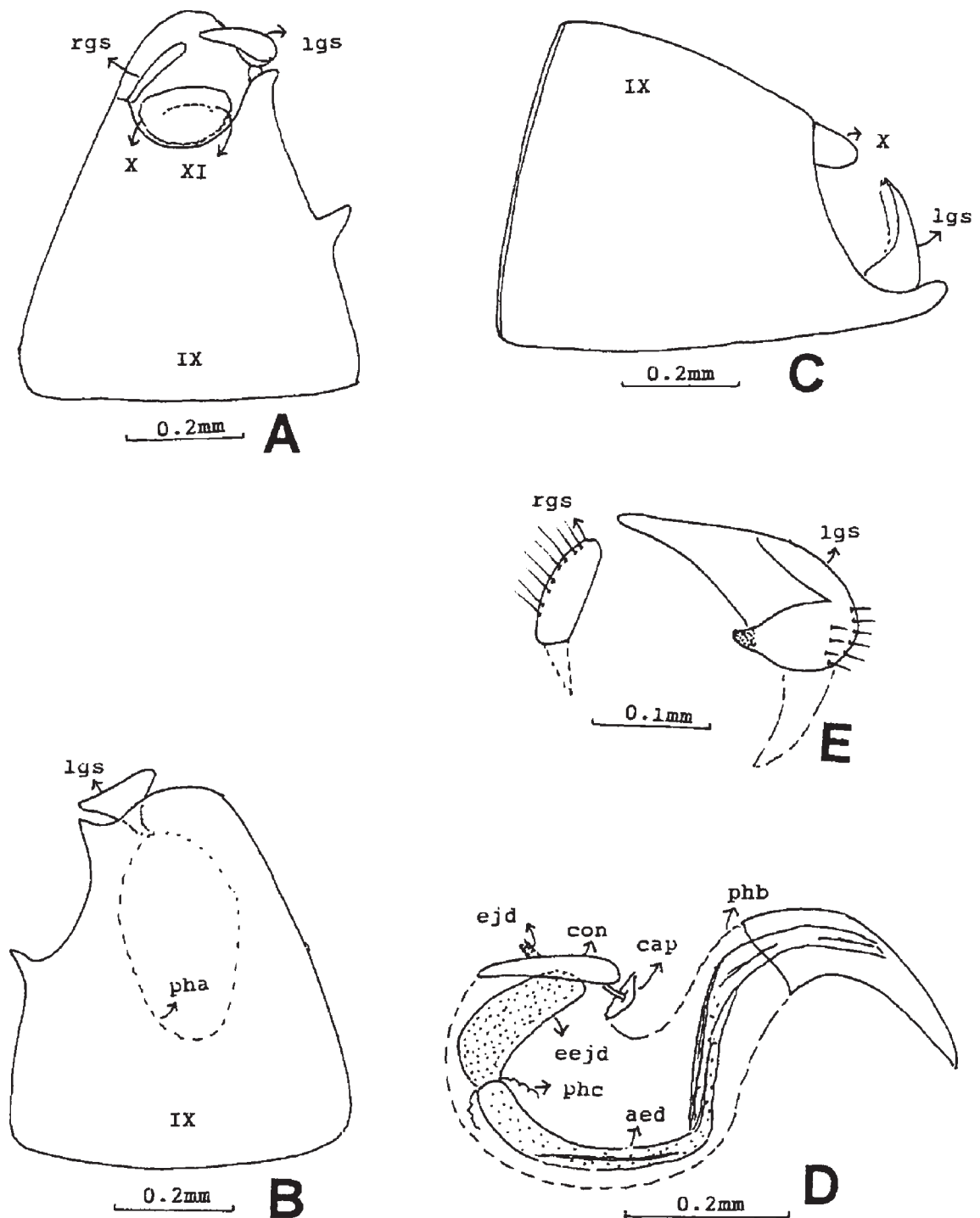


Fig. 35. *Campylomma livida*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. phallus, lateral view; E. genital styles, dorsal view.

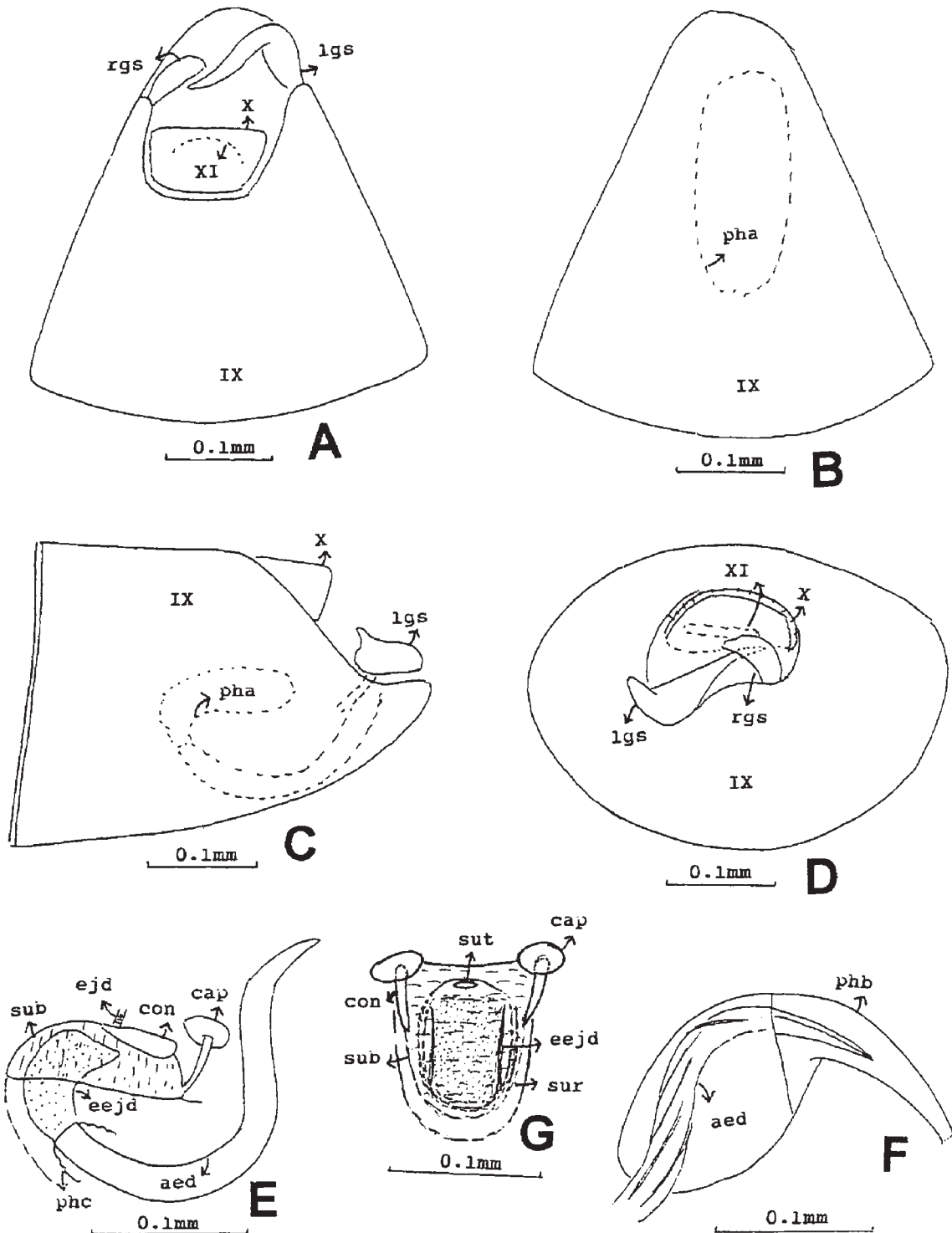


Fig. 36. *Campylomma marjorae*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. apex of phallus, lateral view; G. support bridge, support tube, and expanded ejaculatory duct, dorsal view.

37. *Campylomma brunneicollis* Usinger, 1946
Fig. 37

Basal 1/4 of abdominal segment IX subparallel-sided. Apex of tergite IX 0.52 times width of widest portion; apical margin deeply emarginated. Sternite with symmetrical apex, roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes rather small. Support tube rather upraised. Expanded ejaculatory duct not separated into 2 parts, converging to apex, lightly pigmented, not spiraled. Sheath undifferentiated. Neither phallobase nor phallobasal conjunctiva shortened. Phallobase with sclerotized apical portion. Aedeagus lengthened, S-shaped, not extending over apex of phallobase. Gonopore defined, with transverse ridges, ovate, subterminal.

Specimen examined: 1 male. Taiwan: Nantou Co., Chichi. 14 Mar. 2002. C. S. Lin, sweep net. NMNS ENT 3940-870. Det. by C. S. Lin.

38. *Campylomma rarotongana* Schuh, 1984
Fig. 38

Apex of abdominal tergite IX 0.36 times width of widest portion; apical margin deeply emarginated. Sternite with symmetrical apex, roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left stout, one on right slender.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes comparatively large. Support tube rather upraised. Support ring ring-like. Expanded ejaculatory duct not separated into 2 parts, angulated near middle, lightly pigmented, not spiraled. Sheath undifferentiated. Neither phallobase nor phallobasal conjunctiva shortened. Phallobase with sclerotized apical portion. Aedeagus lengthened, S-shaped, before middle with membranous line, below apical 1/3 with a sclerotized rod, not extending over apex of phallobase. Gonopore defined, with transverse ridges, ovate, subterminal.

Specimen examined: 1 male. Taiwan:

Taichung Co., Waipu. 24 Aug. 2000. C. S. Lin and W. T. Yang, sweep net. Det. by C. S. Lin.

39. *Campylomma sandaracine* Schuh, 1984
Fig. 39

Basal 1/3 of abdominal segment IX subparallel-sided. Apex of abdominal tergite IX 0.46 times width of widest portion; apical margin deeply emarginated. Sternite with symmetrical apex, broad, roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes moderately large. Support tube rather upraised. Support ring ovate in dorsal view. Expanded ejaculatory duct not separated into 2 parts, lightly pigmented, not spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Aedeagus lengthened, S-shaped, at middle forming a circle, apical 1/2 partly membranous, not extending over apex of phallobase. Gonopore defined, with transverse ridges, elongate ovate, subterminal.

Specimen examined: 1 male. Taiwan: Nantou Co., Fong-Huan-Ku Bird Park. 2 Aug. 1997. W. T. Yang. NMNS ENT 2756-134. Det. by C. S. Lin.

40. *Moissonia punctata* (Fieber, 1861)
Fig. 40

Apex of abdominal tergite IX 0.51 times width of widest portion; apical margin deeply emarginated. Sternite with symmetrical apex, roundly produced caudad, then again asymmetrically produced. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes comparatively large. Support tube upraised. Support ring elongate ovate in dorsal view. Expanded ejaculatory duct not separated into 2 parts, lightly pigmented, not spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Aedeagus lengthened, S-shaped, basal 2/3 an armed plate-form structure, its apical 2/3 with membranous area and sclerotized, serrated margin, not extending over apex of phallobase. Gonopore

defined, with transverse ridges, subterminal.

Specimen examined: 1 male. Taiwan: Nantou Co., Tungpu. 1 Feb. 1989. K. W. Huang. NMNS ENT431-1885. Det. C. S. Lin.

41. *Opuna annulata* (Knight, 1935)

Fig. 41

Apex of abdominal tergite IX 0.48 times width of widest portion; apical margin deeply emarginated. Sternite with symmetrical apex, broad, roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes moderately large. Support tube upraised. Support ring elongate ovate in dorsal view. Expanded ejaculatory duct not separated into 2 parts, strongly converging to apex, lightly pigmented, not spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Aedeagus lengthened, seemingly S-shaped, expanded near middle, then abruptly narrowed at apical 1/3. Gonopore defined, with transverse ridges, subterminal.

Specimen examined: 1 male. Taiwan: Taichung. 6 May 1984. C. S. Lin. NMNS ENT 63-1001. Det. by C. S. Lin.

42. *Decomioides schneirlai* Schuh, 1984

Fig. 42

Basal 2/3 of abdominal segment IX subparallel-sided. Apex of abdominal tergite IX 0.41 times width of widest portion; apical margin deeply emarginated. Sternite with seemingly symmetrical apex, roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes comparatively large. Support tube upraised. Support ring rounded in dorsal view. Expanded ejaculatory duct separated into 2 parts; basal part elongate quadrate, lightly pigmented, not spiraled; apical part rather broad, spiraled. Sheath undifferentiated. Neither phallobase nor phallobasal conjunctiva shortened. Phallobase with sclerotized apical portion. Aedeagus

lengthened, not extending over apex of phallobase, S-shaped, near middle forming a circle in lateral view, apical 2/3 partly membranous, ventral margin of apical 2/3 with a long rod-like appendage. Gonopore defined, with transverse ridges, small, ovate.

(11) Tribe Leucophoroperini

43. *Tytthus parviceps* (Reuter, 1890)

Fig. 43

Apex of abdominal tergite IX 0.50 times width of widest portion; apical margin deeply emarginated. Sternite with seemingly symmetrical apex. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes small. Support tube not upraised. Support ring ovate. Expanded ejaculatory duct not separated into 2 parts, converging to apex, lightly pigmented, not spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Aedeagus lengthened, basoventral portion somewhat membranous, S-shaped, not extending over apex of phallobase. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Taichung Co., Wanfeng Hill. 22~23 Mar. 1984. K. S. Lin and K. C. Chou. Det. by C. S. Lin.

44. *Tytthus chinensis* (Stal, 1859)

Fig. 44

Apex of abdominal tergite IX 0.55 times width of widest portion; apical margin deeply emarginated. Sternite with seemingly symmetrical apex. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective, support bridge, support tube, phallobase, and phallobasal conjunctiva not examined. Expanded ejaculatory duct not separated into 2 parts, converging to apex, lightly pigmented, not spiraled. Sheath undifferentiated. Aedeagus lengthened, stiff, S-shaped. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Pingtung Co., Liuchiu I. 22~23 Mar. 1982. K. C. Chou and C. C. Pan. Det. by C. S. Lin.

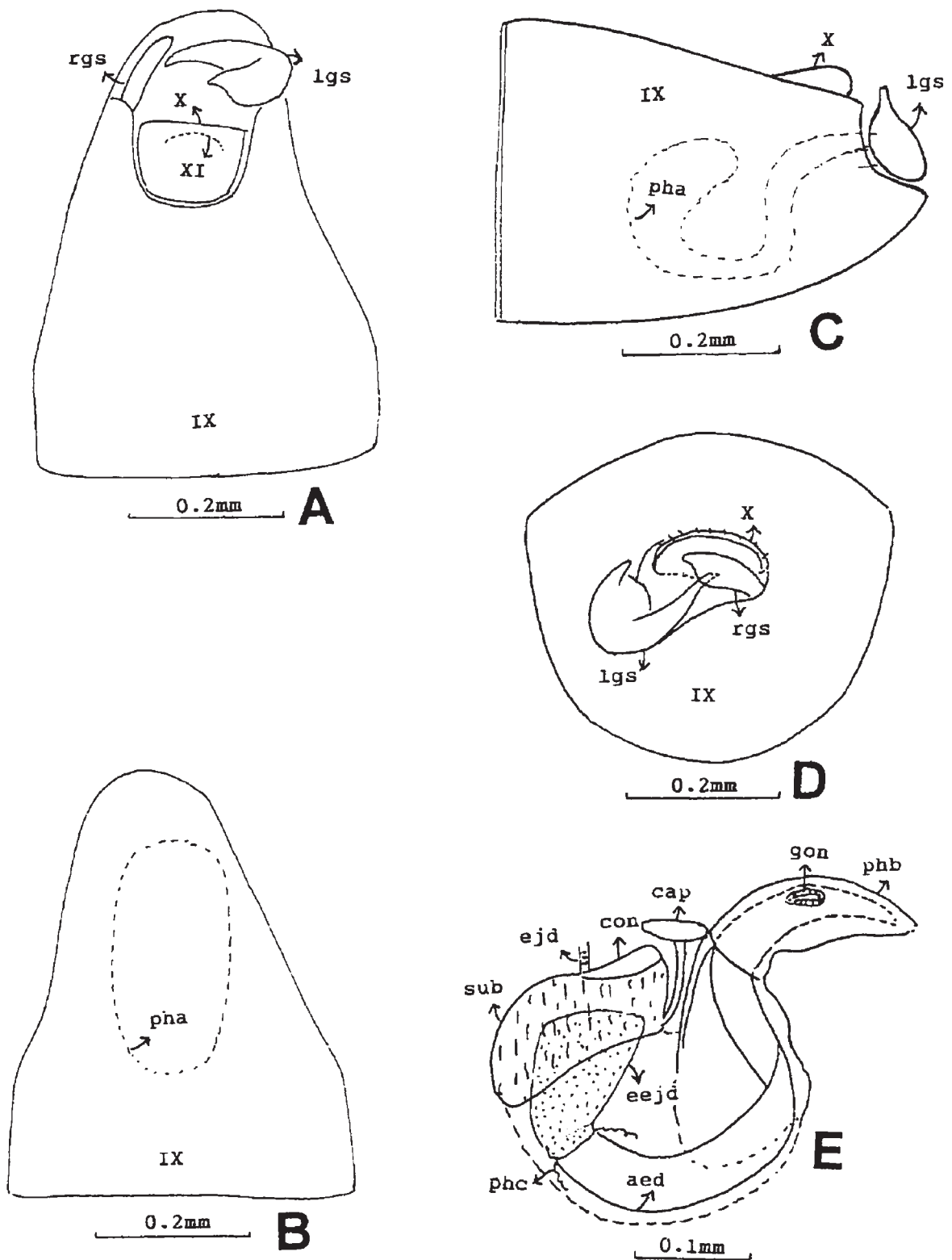


Fig. 37. *Campylomma brunneicollis*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view.

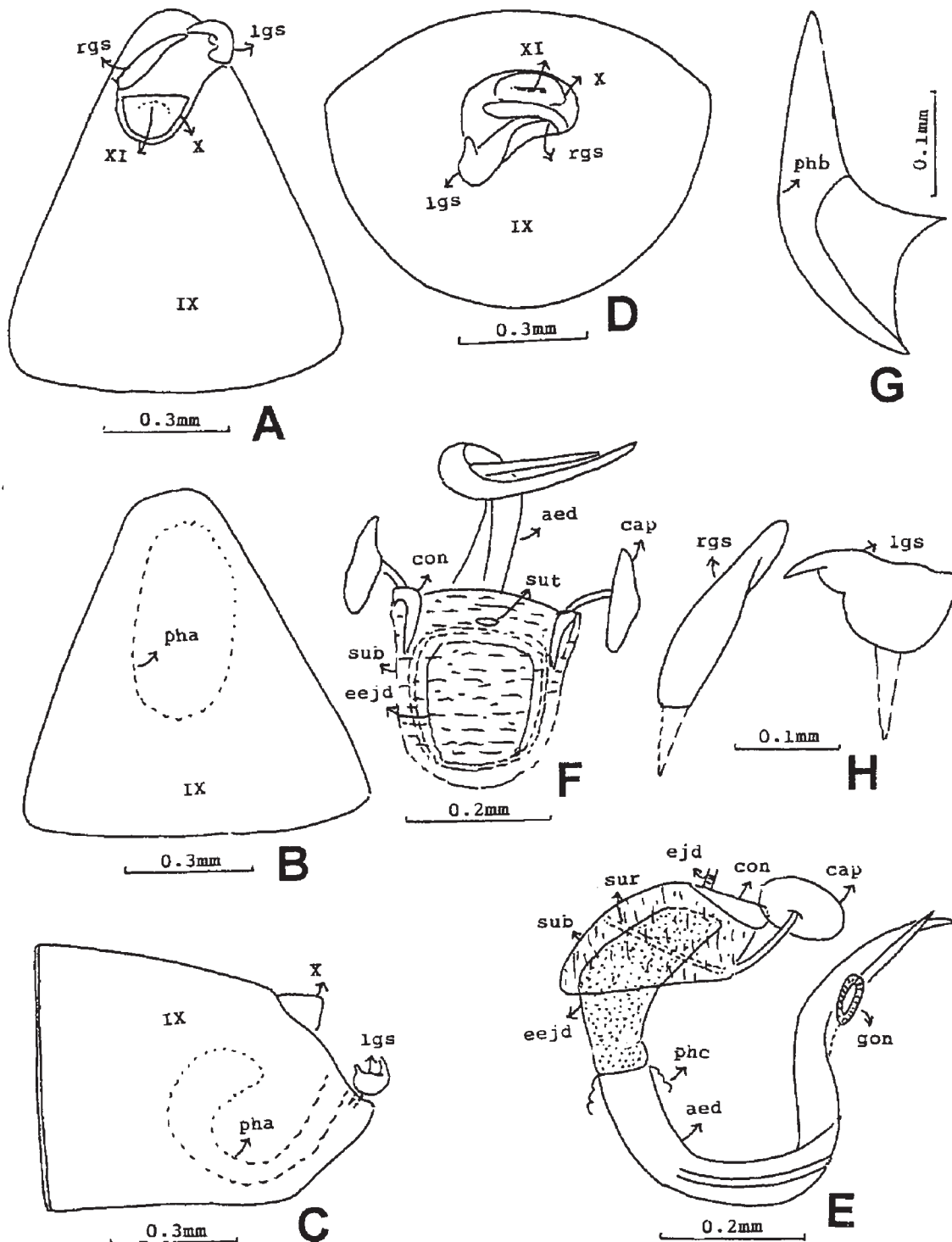


Fig. 38. *Campylomma rarotongana*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. apex of phallobase, lateral view; H. genital styles, dorsal view.

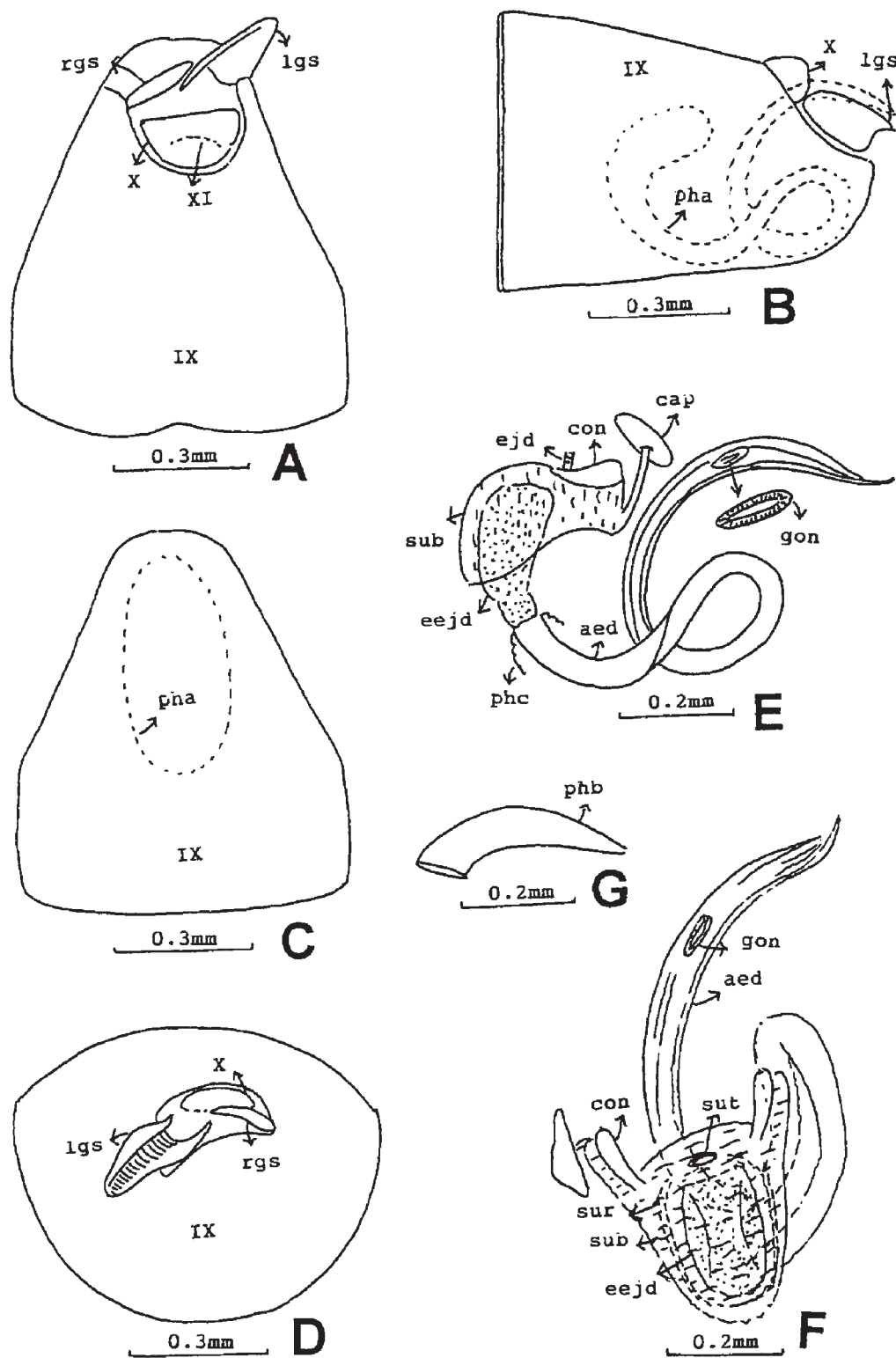


Fig. 39. *Campylomma sandracine*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, lateral view; C. the same, ventral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. apex of phallobase, lateral view.

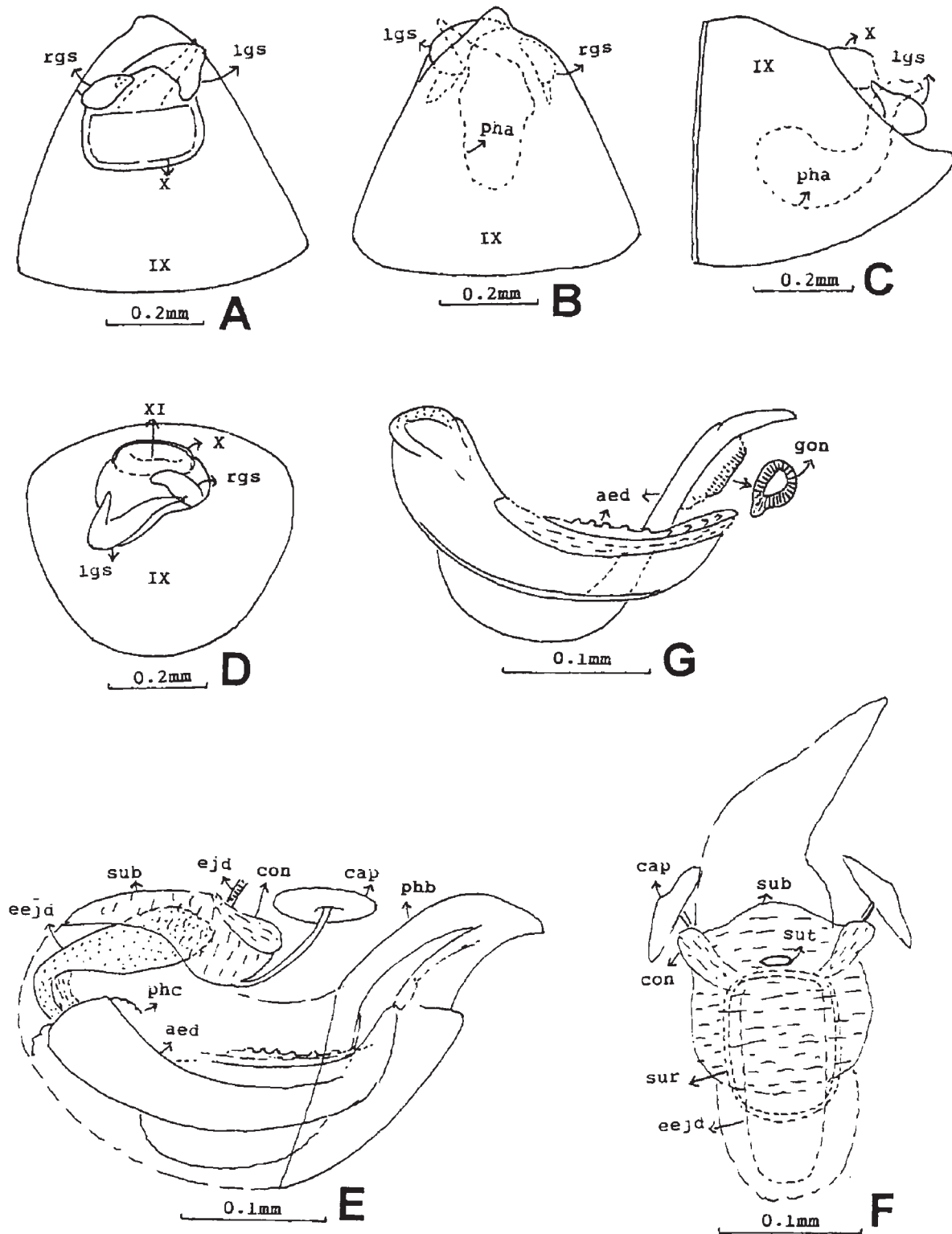


Fig. 40. *Moissonia punctata*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. aedeagus, lateral view.

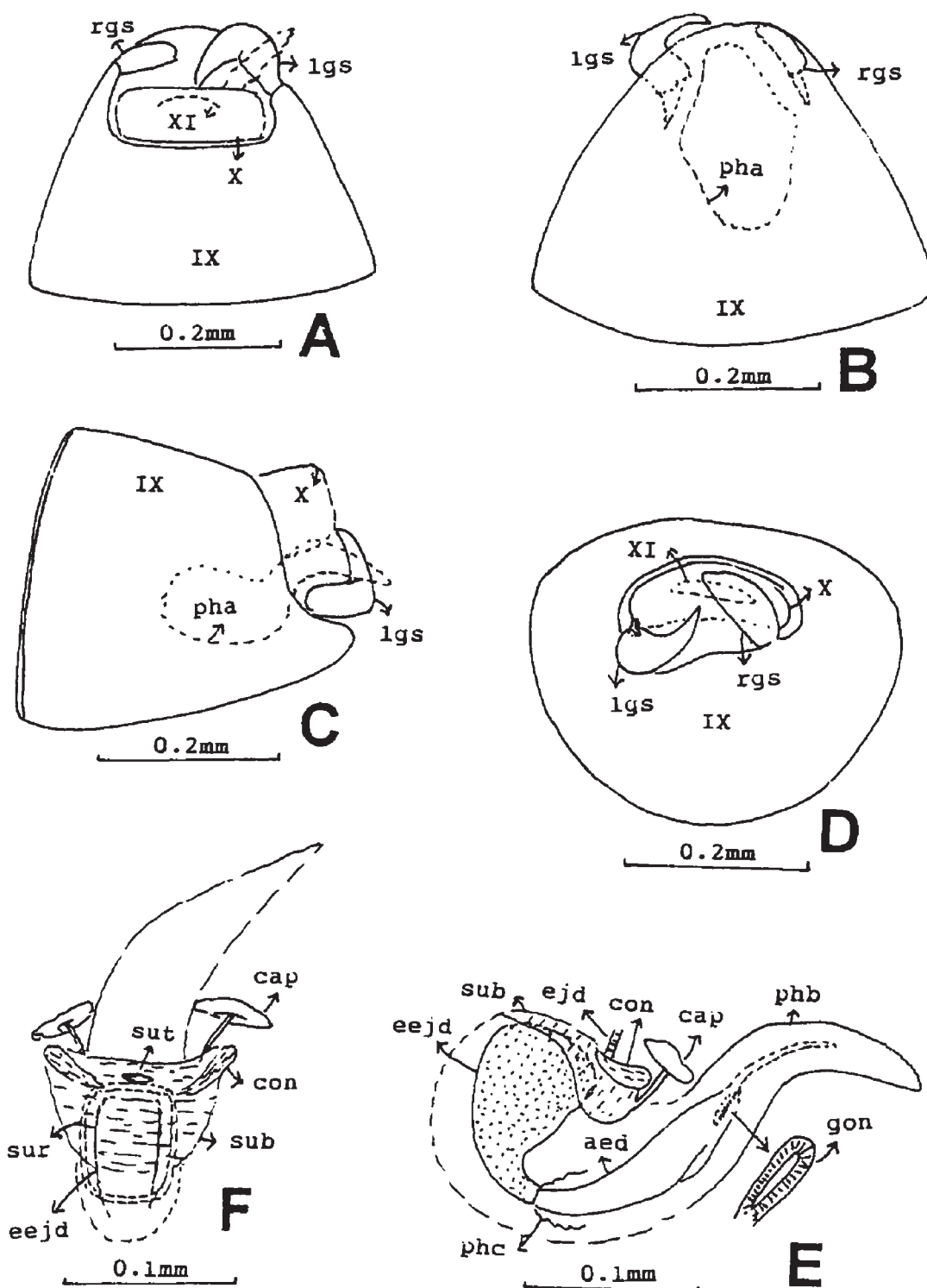


Fig. 41. *Opuna annulata*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view.

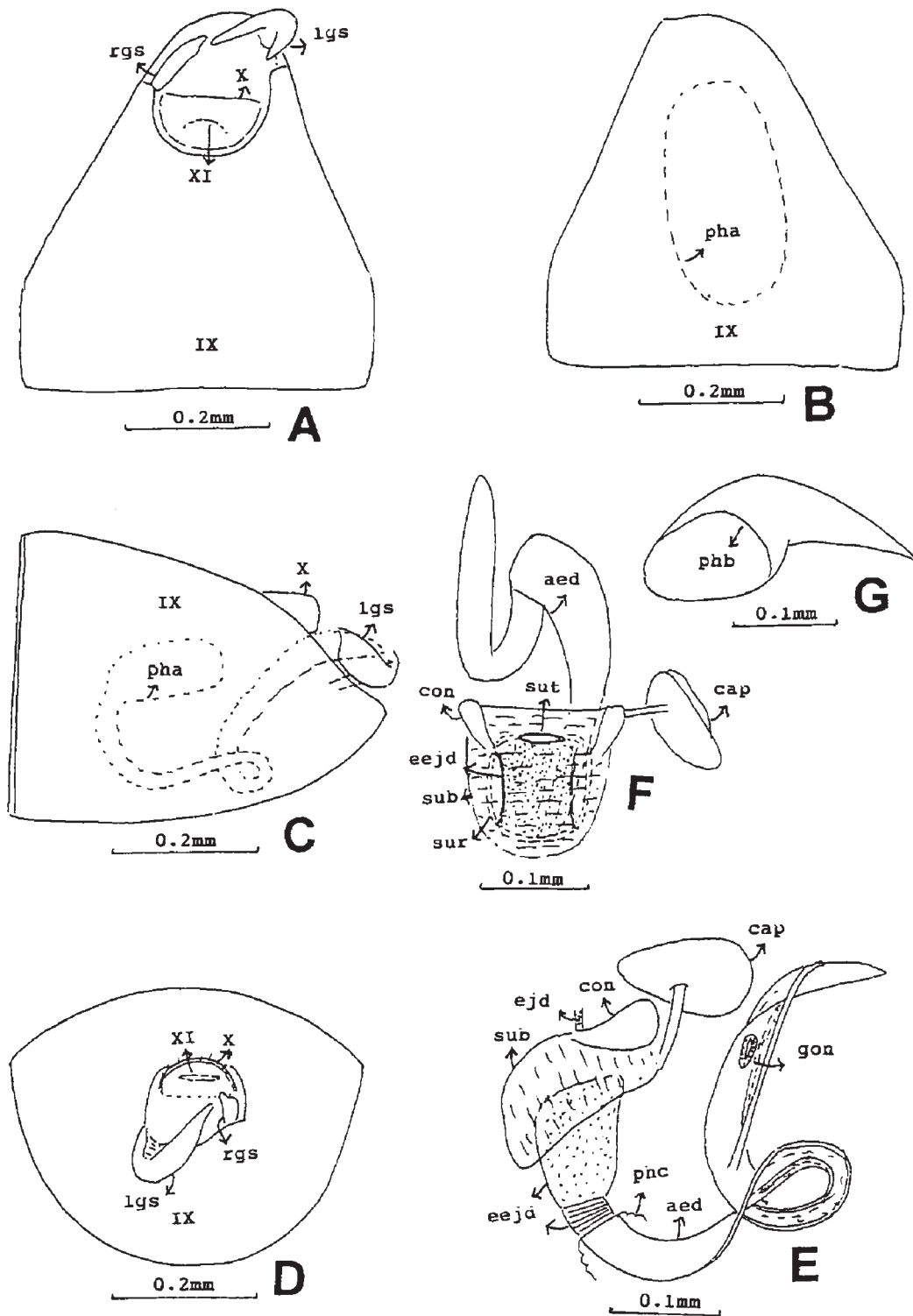


Fig. 42. *Decomioides schneirlai*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. apex of phallobase, lateral view.

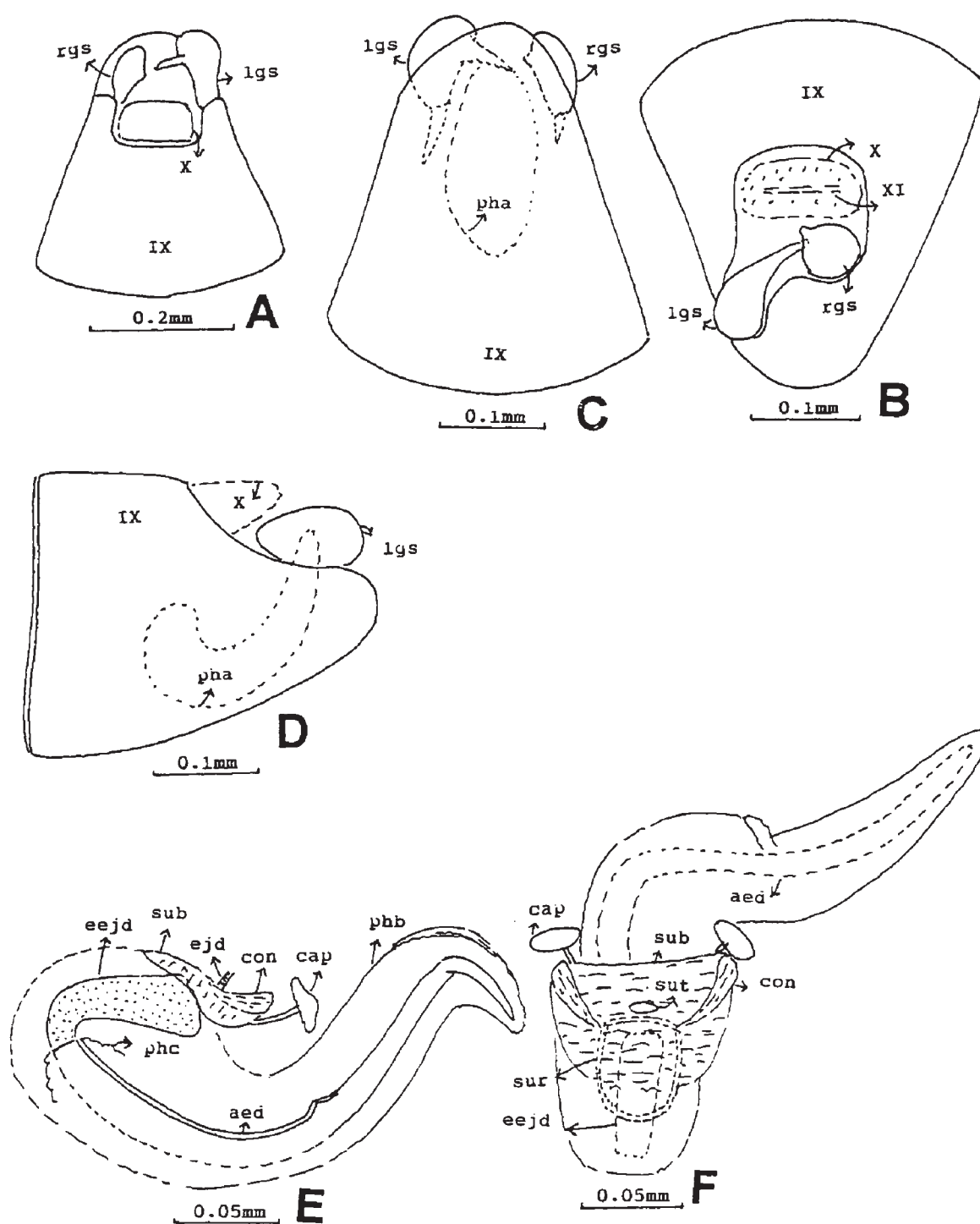


Fig. 43. *Tytthus parviceps*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, dorsocaudal view; C. the same, ventral view; D. the same, lateral view; E. phallus, lateral view; F. the same, dorsal view.

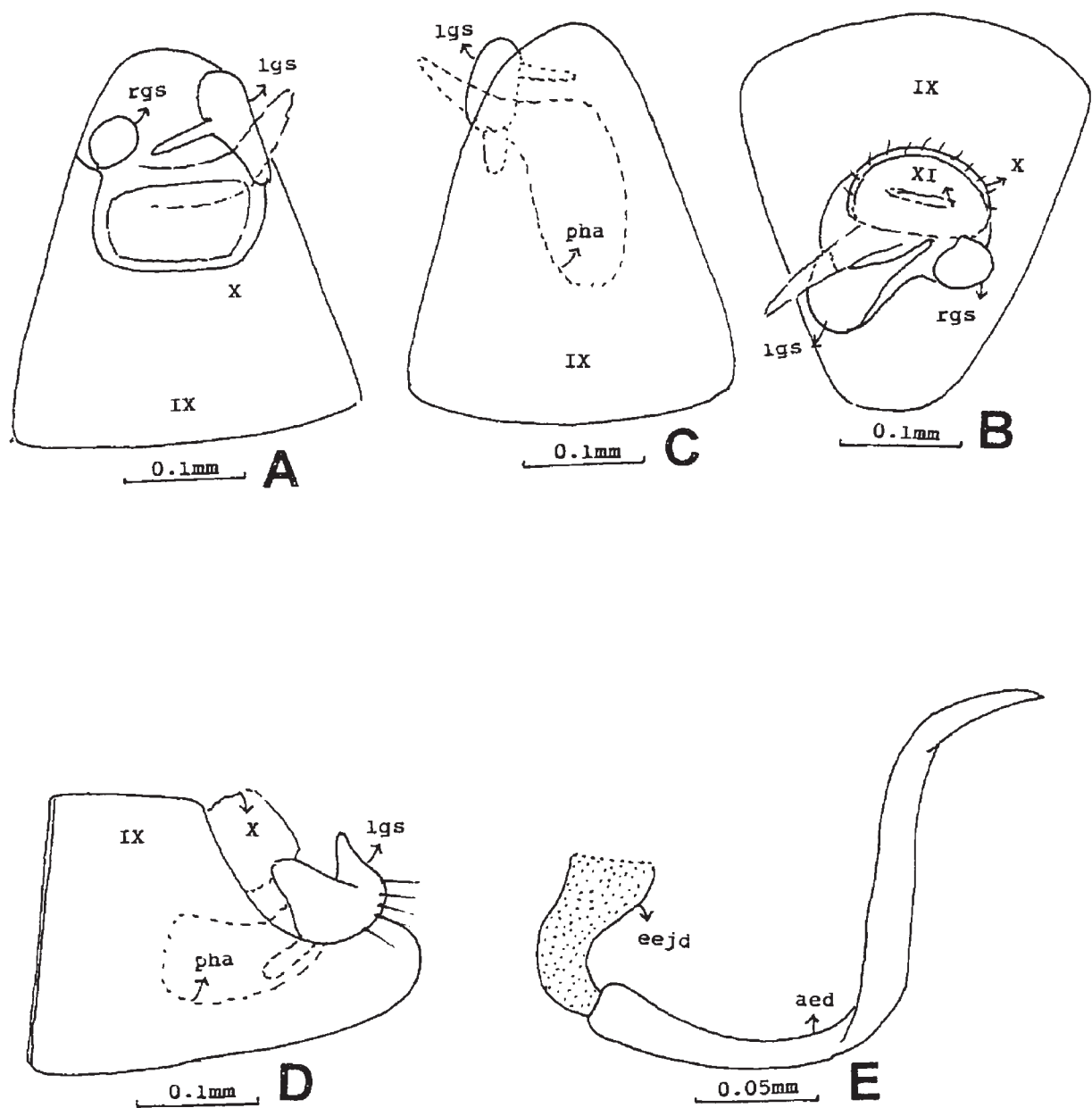


Fig. 44. *Tytthus chinensis*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, dorsocaudal view; C. the same, ventral view; D. the same, lateral view; E. expanded ejaculatory duct and aedeagus, lateral view.

45. *Lasiolabops cosmopolites* Schuh, 1984
Fig. 45

Apex of abdominal tergite IX 0.53 times width of widest portion; apical margin deeply emarginated obliquely. Sternite with symmetrical apex, broadly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed, both submedian portions of apical margin deeply emarginated, forming median subquadrate projection. Capitae processes moderately large. Support tube upraised. Support ring ring-like. Expanded ejaculatory duct not separated into 2 parts, slender, lightly pigmented, not spiraled. Sheath undifferentiated. Neither phallobase nor phallobasal conjunctiva shortened. Aedeagus lengthened, not extending over apex of phallobase, C-shaped. Gonopore defined, with transverse ridges, elongate ovate, subterminal.

Specimen examined: 1 male. Taiwan: Nantou Co., Jenai Township, Chunyang. 21 Jan. 1998. C. S. Lin, mercury light. NMNS ENT 2756-139. Det. by C. S. Lin.

46. *Sejanus crassicornis* (Poppius, 1915)
Fig. 46

Apex of abdominal tergite IX 0.59 times width of widest portion; apical margin deeply emarginated. Sternite with seemingly symmetrical apex, median portion [again?] cone-shaped produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge well developed, transversely expanded in dorsal view. Capitae processes small. Support tube not upraised. Expanded ejaculatory duct not separated into 2 parts, slender, lightly pigmented, not spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Aedeagus lengthened, C-shaped, stiff, not extending over apex of phallobase. Gonopore defined, small, terminal.

Specimen examined: 1 male. Taiwan: Nantou Co., Shihtyutou. 5 Sept. 1989. C. C. Chiang. 1640-2827. Det. by C. S. Lin.

47. *Sejanus funereus* Distant, 1910
Fig. 47

Apex of abdominal tergite IX 0.52 times width of widest portion; apical margin deeply emarginated. Sternite with asymmetrical apex, right laterocaudal portion notched. Abdominal segment X transverse. Abdominal segment XI not examined. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes small. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct not separated into 2 parts, slender, lightly pigmented, not spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Phallobase with sclerotized apical portion. Aedeagus lengthened, not extending over apex of phallobase, stiff, C-shaped. Gonopore defined, with transverse ridges, elongate ovate, terminal.

Specimen examined: 1 male. Taiwan: Nantou Co., Wushe. 29 Oct. 2002. C. S. Lin, sweep net. NMNS ENT 3941-419. Det. by C. S. Lin.

48. *Sejanus neofunereus* Schuh, 1984
Fig. 48

Apex of abdominal tergite IX 0.60 times width of widest portion; apical margin deeply emarginated. Sternite with asymmetrical apex, left laterocaudal portion somewhat notched. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates arched, uniformly wide. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes moderately large. Support tube not upraised. Expanded ejaculatory duct not separated into 2 parts, slender, lightly pigmented, not spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Aedeagus lengthened, not extending over apex of phallobase, C-shaped, stiff. Gonopore defined, with transverse ridges, ovate, terminal.

Specimen examined: 1 male. Taiwan: Nantou Co., Shihtyutou. 5 Sept. 1989. C. C. Chiang, sweep net. 1640-2246. Det. by C. S. Lin.

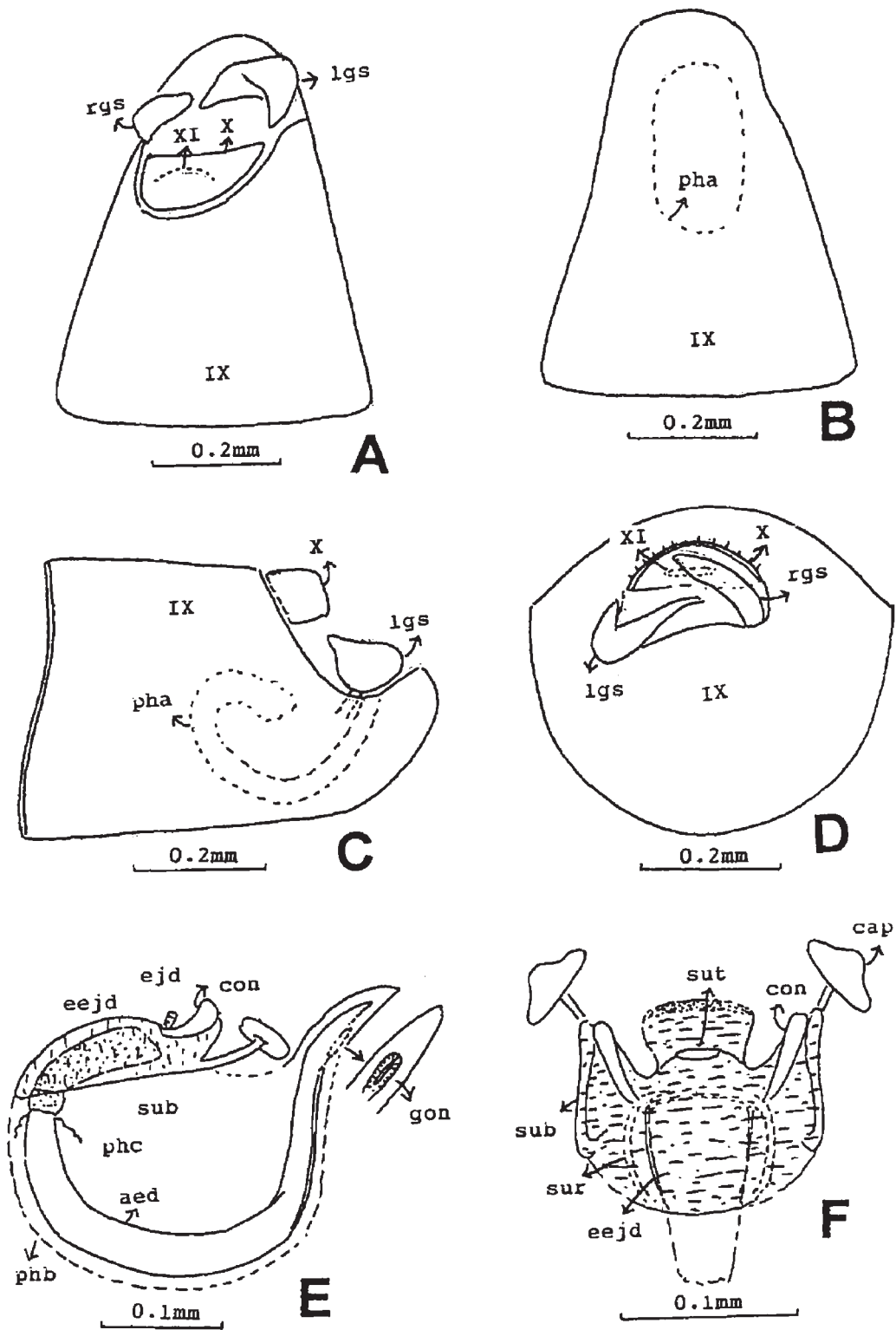


Fig. 45. *Lasiolabops cosmopolites*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. support bridge, support tube, and expanded ejaculatory duct, dorsal view.

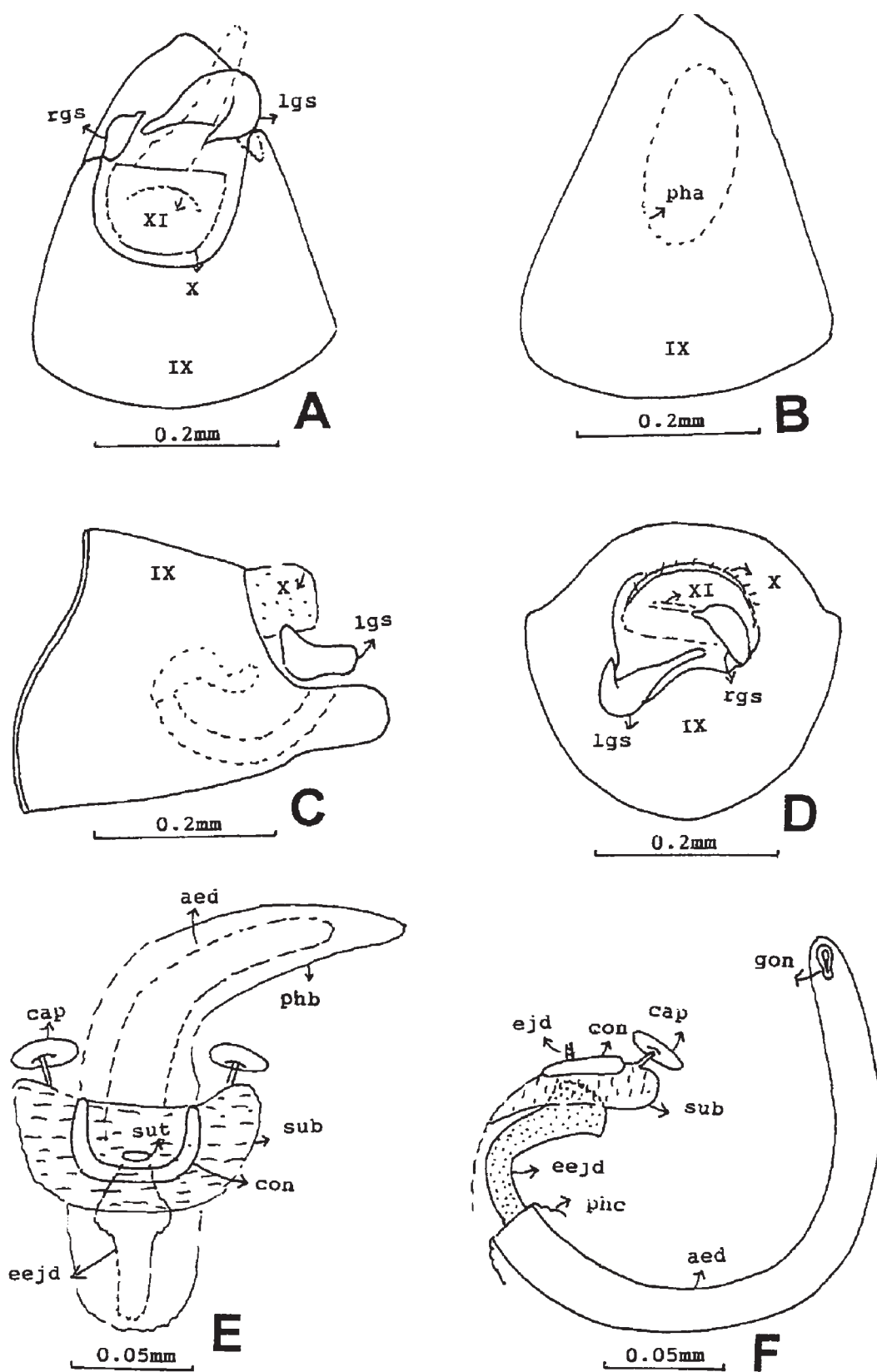


Fig. 46. *Sejanus crassicornis*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, dorsal view; F. the same, lateral view.

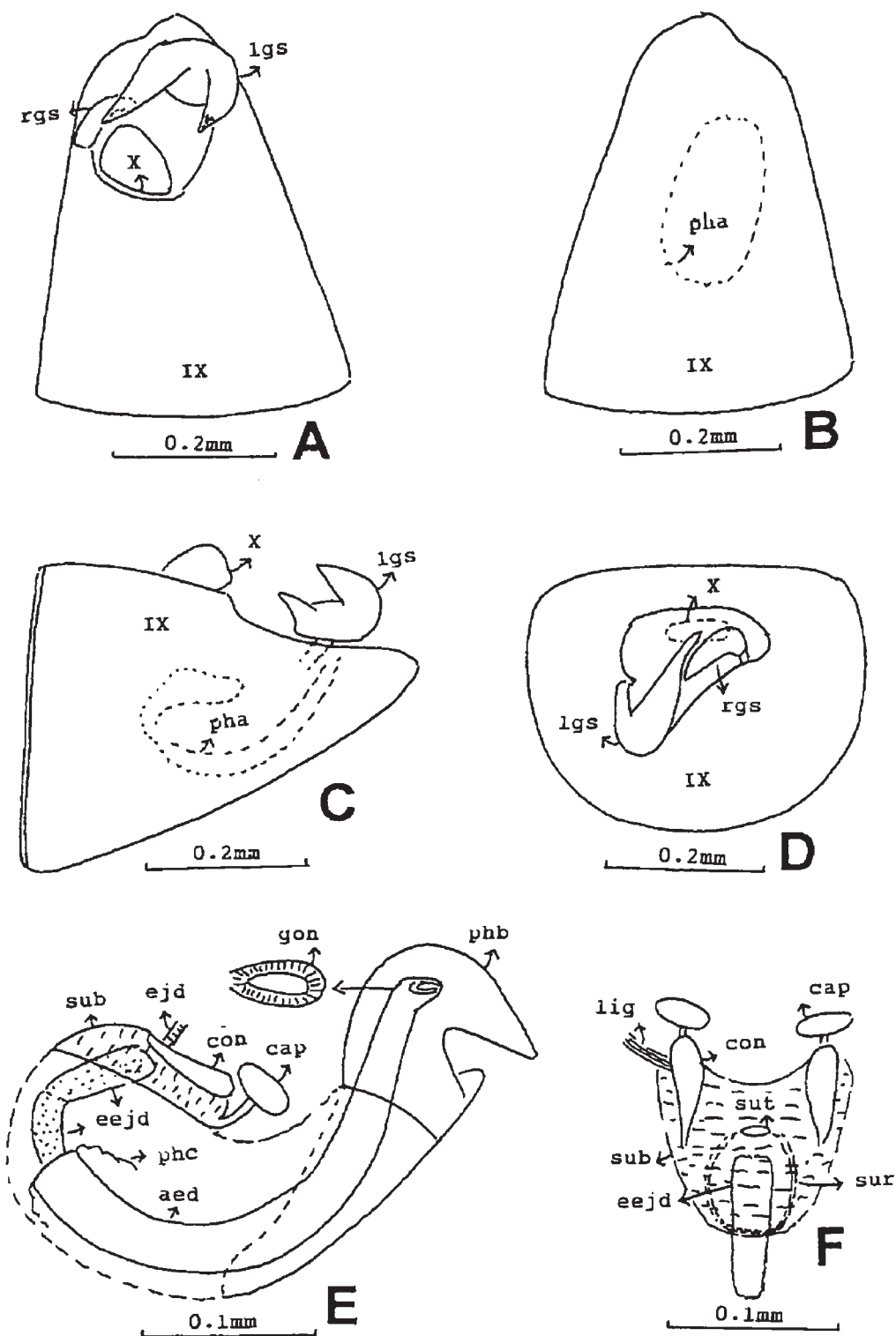


Fig. 47. *Sejanus funereus*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. support bridge, support tube, and expanded ejaculatory duct, dorsal view.

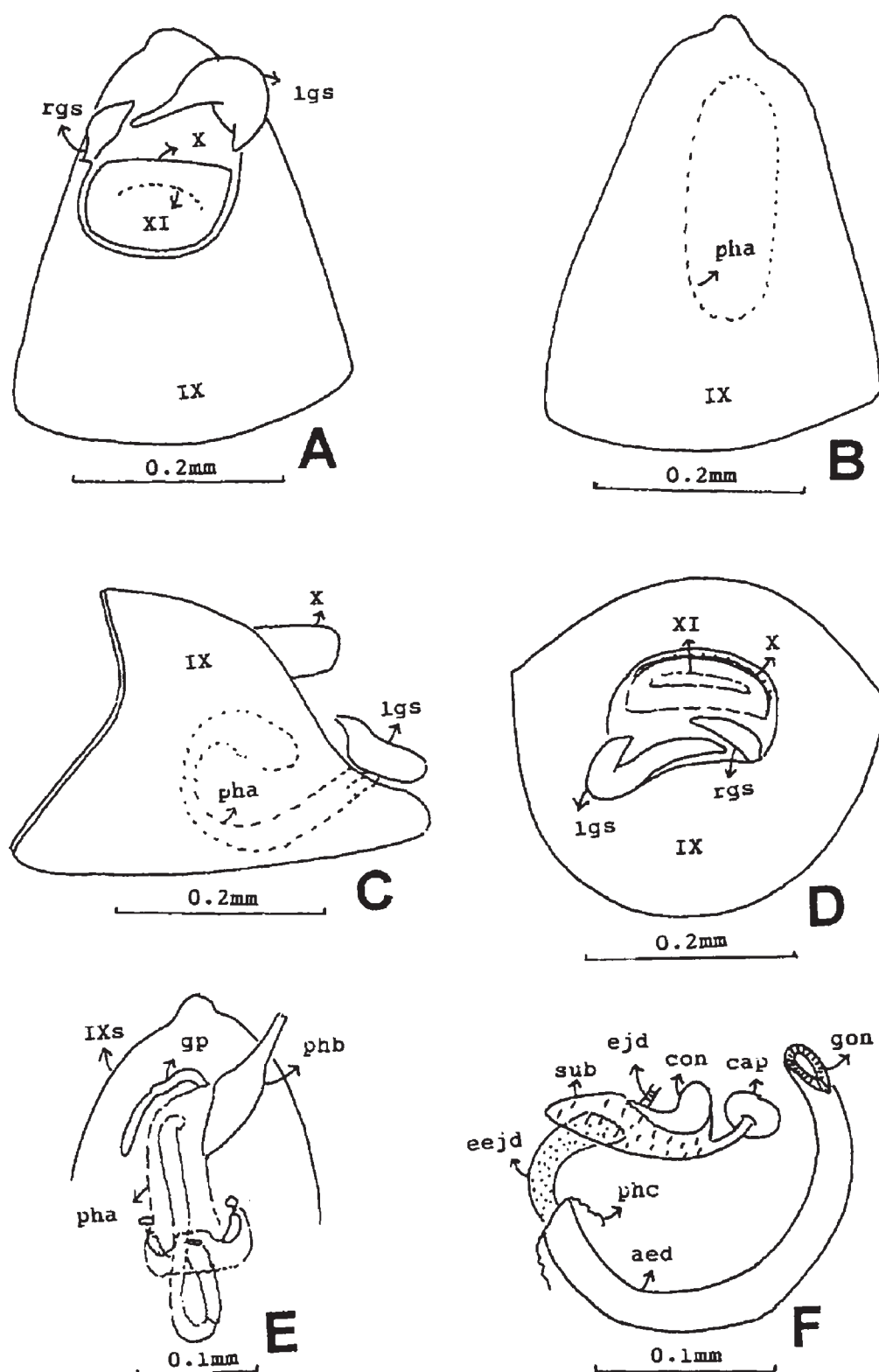


Fig. 48. *Sejanus neofunereus*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. abdominal sternite IX and phallus, dorsal view; F. phallus, lateral view.

(12) Tribe Hallodapini

49. *Hallodapus bruneus* (Poppius, 1915)
Fig. 49

Apex of abdominal tergite IX 0.39 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, left laterocaudal margin somewhat straight. Abdominal segment X transverse. Abdominal segment XI not examined. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes moderately large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part elongate quadrate, lightly pigmented, not spiraled; apical part converging to apex, spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Aedeagus lengthened, extending over apex of phallobase, S-shaped, apical 4/5 partly membranous. Gonopore defined, with transverse ridges, elongate ovate.

Specimen examined: 1 male. Taiwan: Taichung Co., Chingshui. 13~14 Nov. 2002. C. S. Lin and W. T. Yang. Det. by C. S. Lin.

50. *Hallodapus persimilis* Poppius, 1915
Fig. 50

Apex of abdominal tergite IX 0.46 times width of widest portion; apical margin deeply emarginated. Sternite with symmetrical apex, broadly produced caudad, rounded. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Both submedian portions of support bridge well developed, apical margin deeply emarginated, forming median subquadrate projection. Capitae processes moderately large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part slender, heavily pigmented, not spiraled; apical part spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Phallobase with sclerotized apical portion. Aedeagus lengthened, extending over apex of phallobase, S-shaped, apical 3/4 partly membranous. Gonopore defined, with

transverse ridges, elongate ovate.

Specimen examined: 1 male. Taiwan: Penghu Co., Baisha. 23 Apr. 1989. K. W. Huang, sweep net. 440-356. Det. by C. S. Lin.

51. *Azizus brasiliensis* Distant, 1910
Fig. 51

Left ventrocaudal portion of abdominal segment IX with a small process. Apex of abdominal tergite IX deeply emarginated. Sternite with seemingly symmetrical apex. Abdominal segment X transverse. Abdominal segment XI not examined. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed, both submedian portions of apical margin shallowly emarginated, forming median short quadrate projection. Capitae processes moderately large. Support tube not upraised. Support ring elongate ovate in dorsal view. Expanded ejaculatory duct not separated into 2 parts, slender, lightly pigmented, not spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Phallobase with sclerotized apical portion. Aedeagus lengthened, extending over apex of phallobase, S-shaped, stiff. Gonopore defined, with transverse ridges, elongate ovate.

Specimen examined: 1 male. Taiwan: Taitung Co., Lanyu (Orchid I.). 7~12 Aug. 2000. C. S. Lin and W. T. Yang, sweep net. NMNS ENT3443-926. Det. by C. S. Lin.

Remarks on Description of the Phylinae

Abdominal segment IX with completely fused tergite and sternite; not dorsoventral elongate quadrate in lateral view; its posterior opening not directed ventrocaudad; its anterior margin with undifferentiated extension; its surface either with or without a process. Abdominal segment X transverse; directed caudad; situated after abdominal tergite IX. Genital styles asymmetrical in shape and side, one on left larger.

Connective either complete or with reduced transverse portion. Support bridge either poorly or well developed, not winged. Capitae processes differentiated. Expanded ejaculatory duct either separated into 2 parts; basal part variable in form, not spiraled; apical part spiraled; or not separated into 2 parts, not spiraled. Sheath undifferentiated. Neither phallobase nor phallobasal conjunctiva

shortened. Phallobasal conjunctival processes exposed in genital chamber undifferentiated. Exposed phallobasal conjunctiva undifferentiated. Aedeagus lengthened. Gonopore either difficult to recognize, or defined, with transverse ridges.

VI. Subfamily Bryocorinae

(13) Tribe Dicyphini

52. *Macrolophus* sp.

Fig. 52

Apex of abdominal tergite IX 0.64 times width of widest portion; apical margin deeply emarginated. Sternite with asymmetrical apex, left 1/3 notched. Abdominal segment X elongate. Abdominal segment XI not retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge well developed, rather small in lateral view. Capitae processes small. Support tube not upraised. Expanded ejaculatory duct separated into 2 parts; basal part converging to apex, lightly pigmented, not spiraled; apical part spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Aedeagus moderately long, partly membranous. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Nantou Co., Tungpu. 2~25 Nov. 1982. K. C. Chou and S. P. Huang. Det. by C. S. Lin.

53. *Nesidiocoris plebejus* (Poppius, 1915)

Fig. 53

Apex of abdominal tergite IX 0.76 times width of widest portion; apical margin shallowly emarginated. Sternite with seemingly symmetrical apex, median portion acutely produced caudad. Abdominal segment X very broad in dorsal view, elongate in lateral view. Abdominal segment XI not retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped, characteristically situated at base of phallobase and directed anterodorsad within segment IX. Support bridge poorly developed, rather small in lateral view. Capitae processes moderately large. Support tube not upraised. Support ring unrecognizable. Expanded ejaculatory duct separated into 2 parts; basal part elongate oval,

lightly pigmented, not spiraled; apical part spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Phallobasal conjunctiva with processes within cavity. Aedeagus shortened. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Nantou Co., Sungkang. Dec. 1985. K. S. Lin. Det. by C. S. Lin.

54. *Macrolophus glaucescens* Fieber, 1858

Fig. 54

Apex of abdominal tergite IX 0.68 times width of widest portion; apical margin shallowly emarginated. Sternite with symmetrical apex, median portion trapezoidal, produced caudad. Abdominal X segment elongate. Abdominal segment XI not retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge poorly developed, triangular in lateral view. Capitae processes moderately large. Support tube more or less upraised. Expanded ejaculatory duct separated into 2 parts; basal part triangular, not spiraled; apical part slender, spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Phallobasal conjunctiva without process within cavity. Aedeagus seemingly [existing/present?], at least ventral margin, compare to the following species, judged to be wholly reduced. Gonopore wholly reduced.

Specimen examined: 1 male. China: Sichuan Prov., Baoxing. 8 June 1963. L. Y. Zheng.

55. *Helopeltis cinchonae* Mann, 1907

Fig. 55

Abdominal segment IX with differentiated extension. Apex of abdominal tergite IX 0.44 times width of widest portion; apical margin extremely emarginated. Sternite with symmetrical apex, roundly produced caudad, with distinctly emarginated base. Abdominal segment X elongate. Abdominal segment XI not retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge poorly developed, triangular in lateral view. Capitae processes moderately large. Support tube not upraised. Expanded ejaculatory duct separated into 2 parts; basal part quadrate, caudal 1/2 heavily

pigmented, not spiraled; apical part slender, spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Phallobasal conjunctiva without appendage within cavity. Aedeagus and gonopore wholly reduced.

Specimen examined: 1 male. Taiwan: Nantou Co., Wushe. 22 Aug. 2000. C. S. Lin. Det. By C.S. Lin.

56. *Helopeltis fasciaticollis* Poppius, 1915

Fig. 56

Abdominal segment IX with differentiated extension. Apex of abdominal tergite IX 0.43 times width of widest portion; apical margin deeply emarginated. Sternite with symmetrical apex, median portion roundly produced caudad; basal margin M-shaped emarginated. Abdominal segment X elongate. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical, one on left larger.

Connective complete, V-shaped. Support bridge poorly developed, small, triangular in lateral view. Capitate processes moderate large. Support tube not triangular in lateral view, probably indicating modification of support ring. Expanded ejaculatory duct separated into 2 parts; basal part triangular, heavily pigmented, not spiraled; apical part slender, spiraled. End of expanded ejaculatory duct characteristically connected to phallobasal conjunctiva at 1 side, not at its bottom per normal conditions. Neither phallobase nor phallobasal conjunctiva shortened. Phallobasal conjunctiva with a large process within basoventral portion and many cuticular spots on basal surface. Aedeagus and gonopore wholly reduced.

Specimen examined: 1 male. Taiwan: Pingtung Co., Kenting. 26 Apr. 1992. C. Y. Lee, Det. by C. S. Lin.

57. *Mansoniella formosana* Lin, 2001

Fig. 57

Abdominal segment IX with differentiated extension. Apex of abdominal tergite IX 0.60 times width of widest portion; apical margin obliquely shallowly emarginated. Sternite with asymmetrical apex, right angle of left laterocaudal portion notched. Abdominal segment X transverse, directed to left and laterocaudad. Abdominal segment XI retracted into segment X. Genital

plates semicircular, different from arched form of most Miridae. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge poorly developed, small, triangular in lateral view. Capitate processes moderately large. Support tube more or less upraised. Expanded ejaculatory duct separated into 2 parts; basal part slender, heavily pigmented, not spiraled; apical part slender, obscurely spiraled, its end connected to bottom of phallobasal conjunctiva. Phallobasal conjunctiva without appendage. Neither phallobase nor phallobasal conjunctiva shortened. Aedeagus and gonopore wholly reduced.

Specimens examined: 2 males. Taiwan: Nantou Co., Wushe. 29 Oct. 2002. C. S. Lin. Det. by C. S. Lin.

58. *Mansoniella* sp.

Fig. 58

Abdominal segment IX with differentiated extension. Apex of abdominal tergite IX 0.73 times width of widest portion; apical margin obliquely deeply emarginated. Sternite with seemingly symmetrical apex. Abdominal segment X transverse, directed to left and laterocaudad. Abdominal segment XI not examined. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge poorly developed, triangular in lateral view. Capitate processes moderately large. Support tube somewhat upraised. Expanded ejaculatory duct separated into 2 parts; basal part elongate, caudal margin heavily pigmented, not spiraled; apical part slender, spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Phallobasal conjunctiva with 3 short processes at basoventral portion within cavity. Aedeagus and gonopore wholly reduced.

Specimen examined: 1 male. Taiwan: Taoyuan, Shuyuan. 28 May 1982. B. S. Chang.

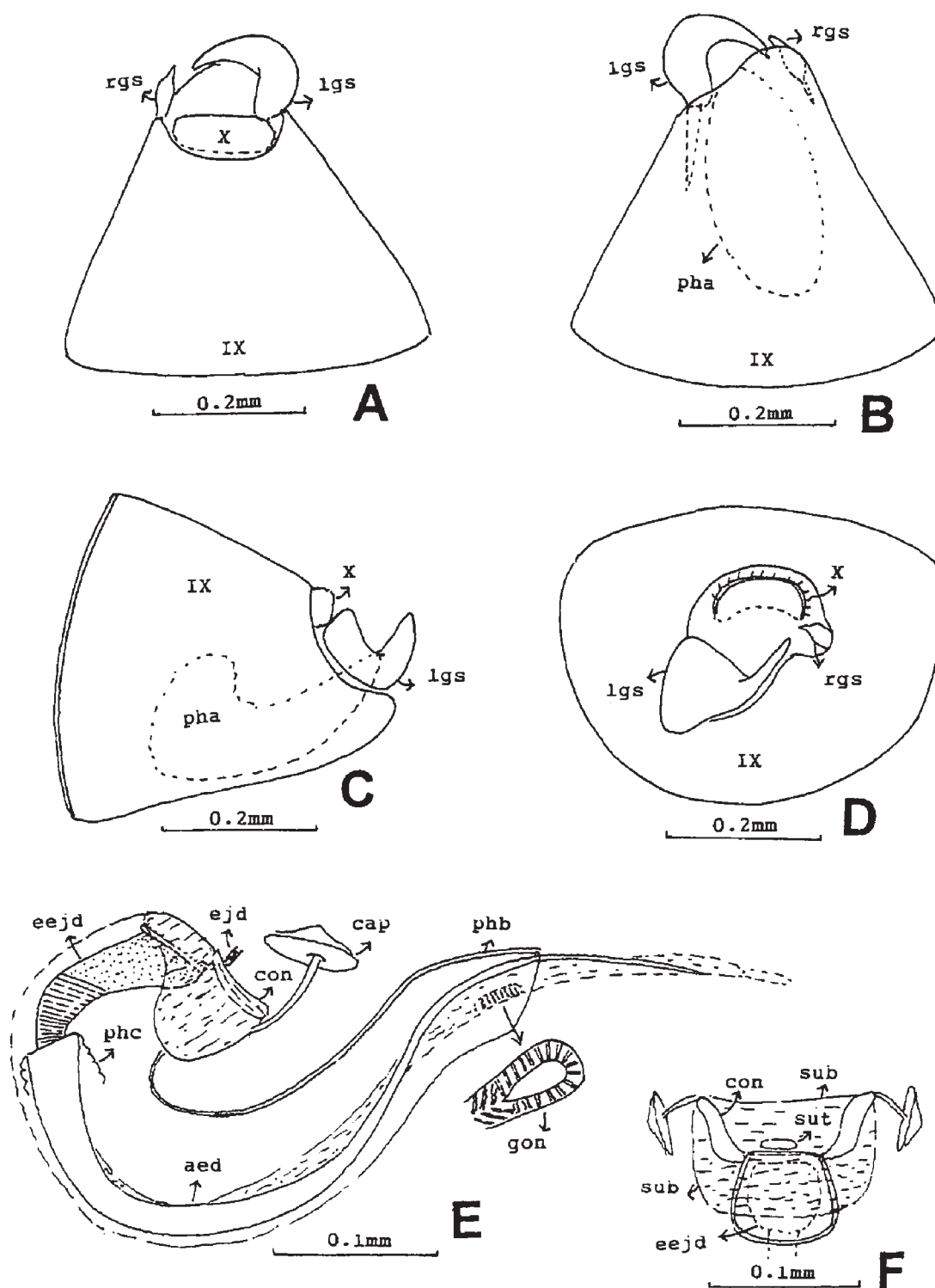


Fig. 49. *Hallodapus bruneus*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. support bridge, support tube, and expanded ejaculatory duct, dorsal view.

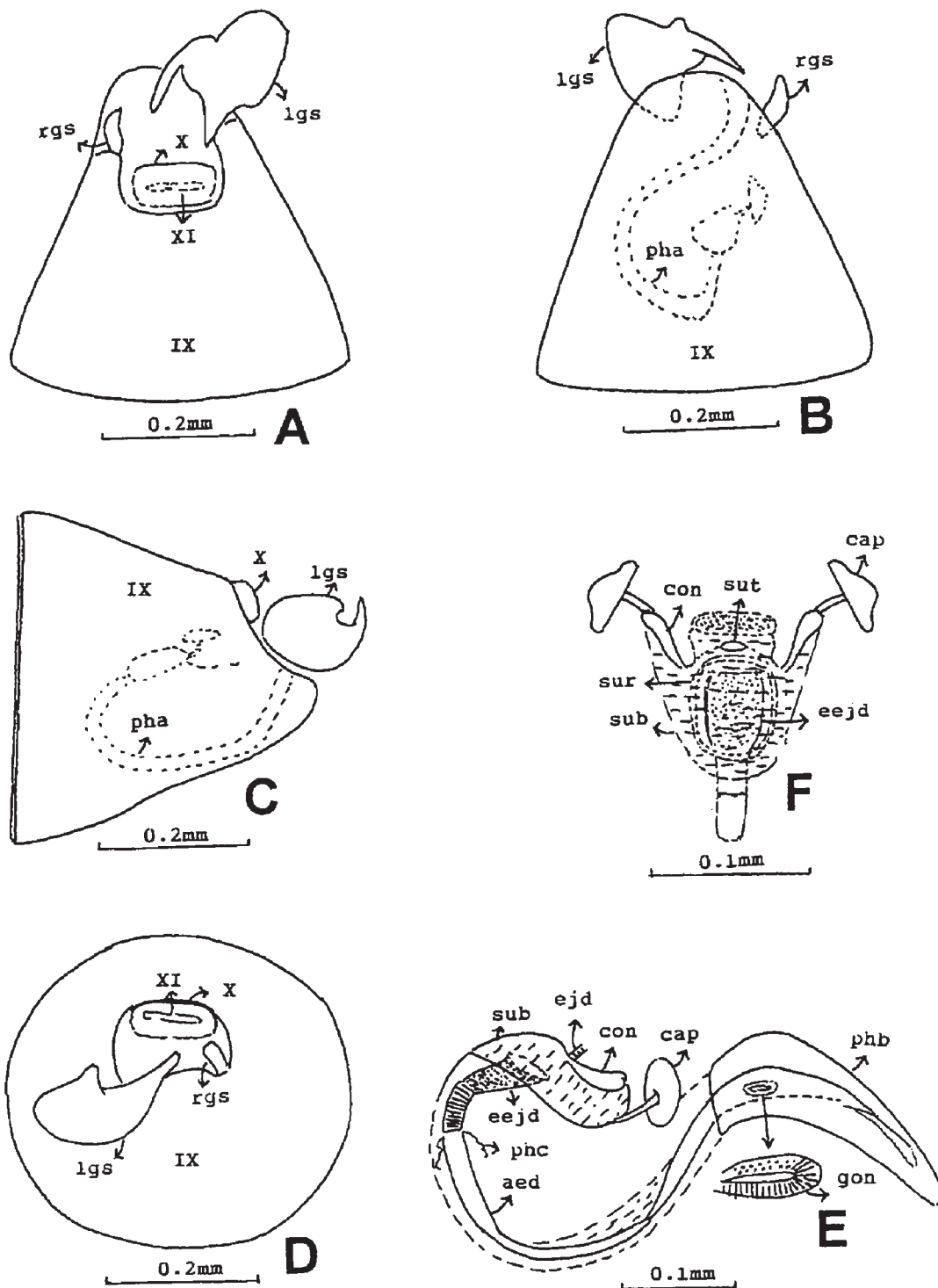


Fig. 50. *Hallodapus persimilis*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. support bridge, support tube, and expanded ejaculatory duct, dorsal view.

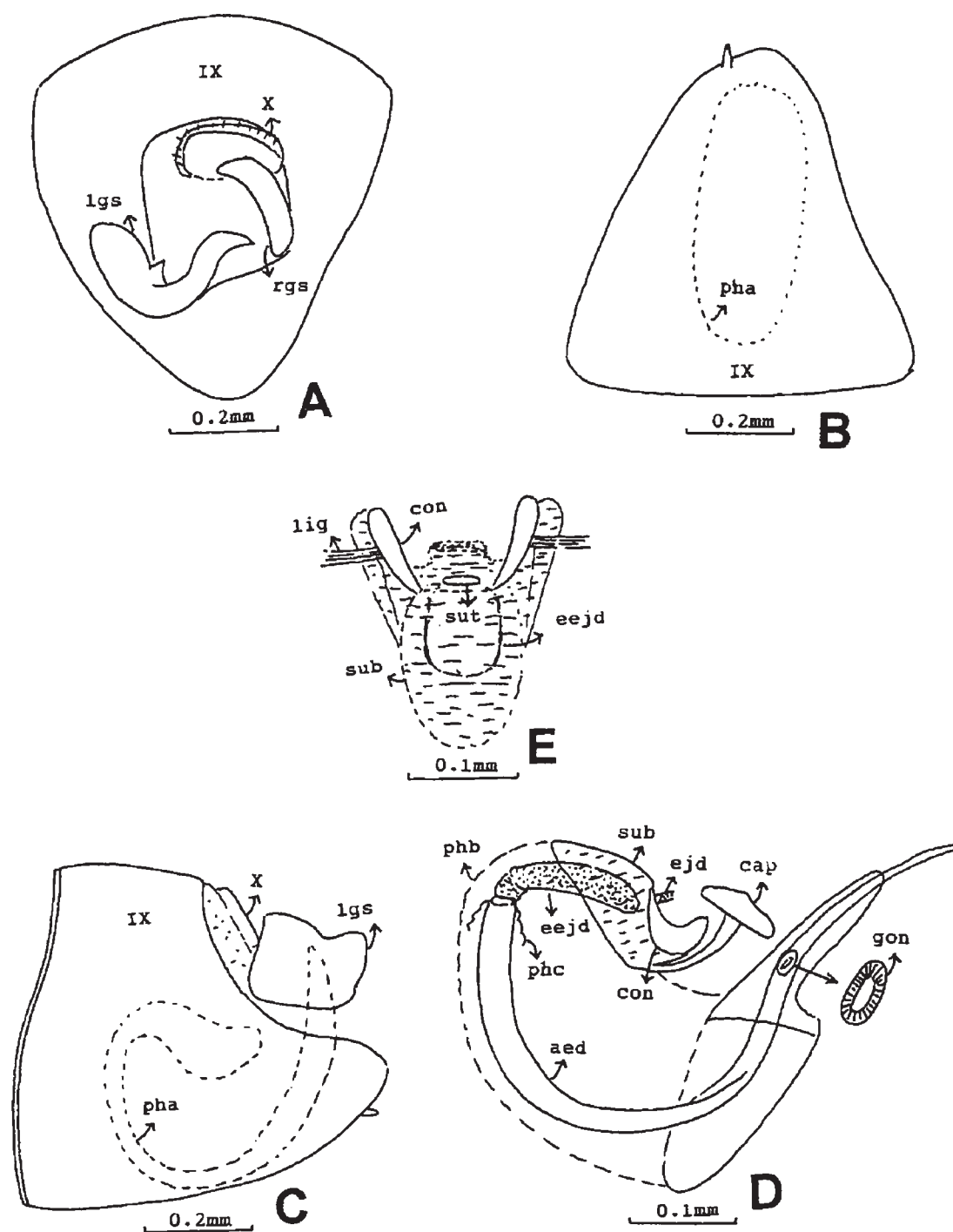


Fig. 51. *Azizus brasiliensis*. A. Abdominal segments IX and X and genital styles, dorsocaudal view; B. the same, ventral view; C. the same, lateral view; D. phallus, lateral view; E. support bridge, support tube, and expanded ejaculatory duct, dorsal view.

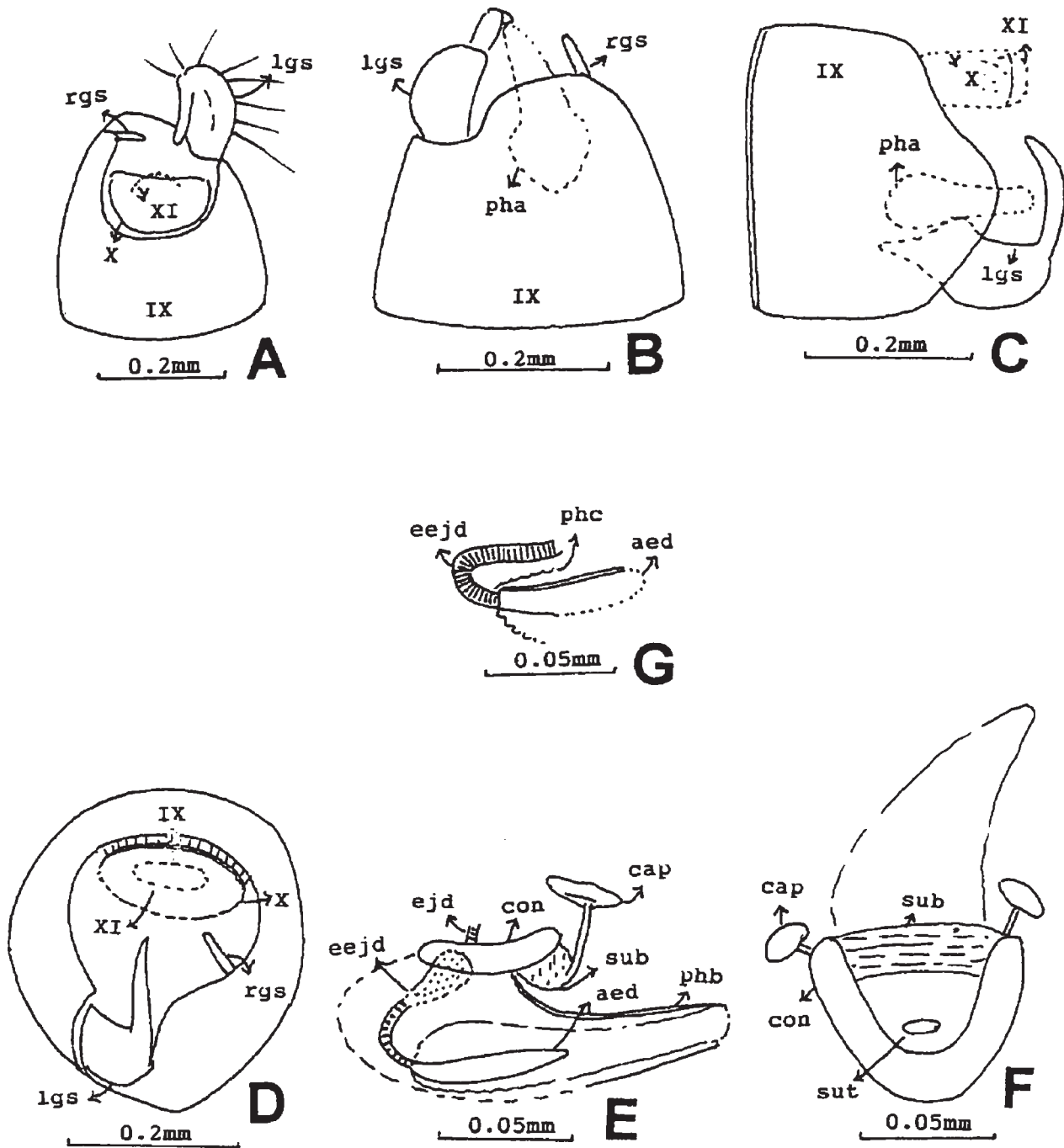


Fig. 52. *Macrolophus* sp. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. expanded ejaculatory duct and aedeagus, lateral view.

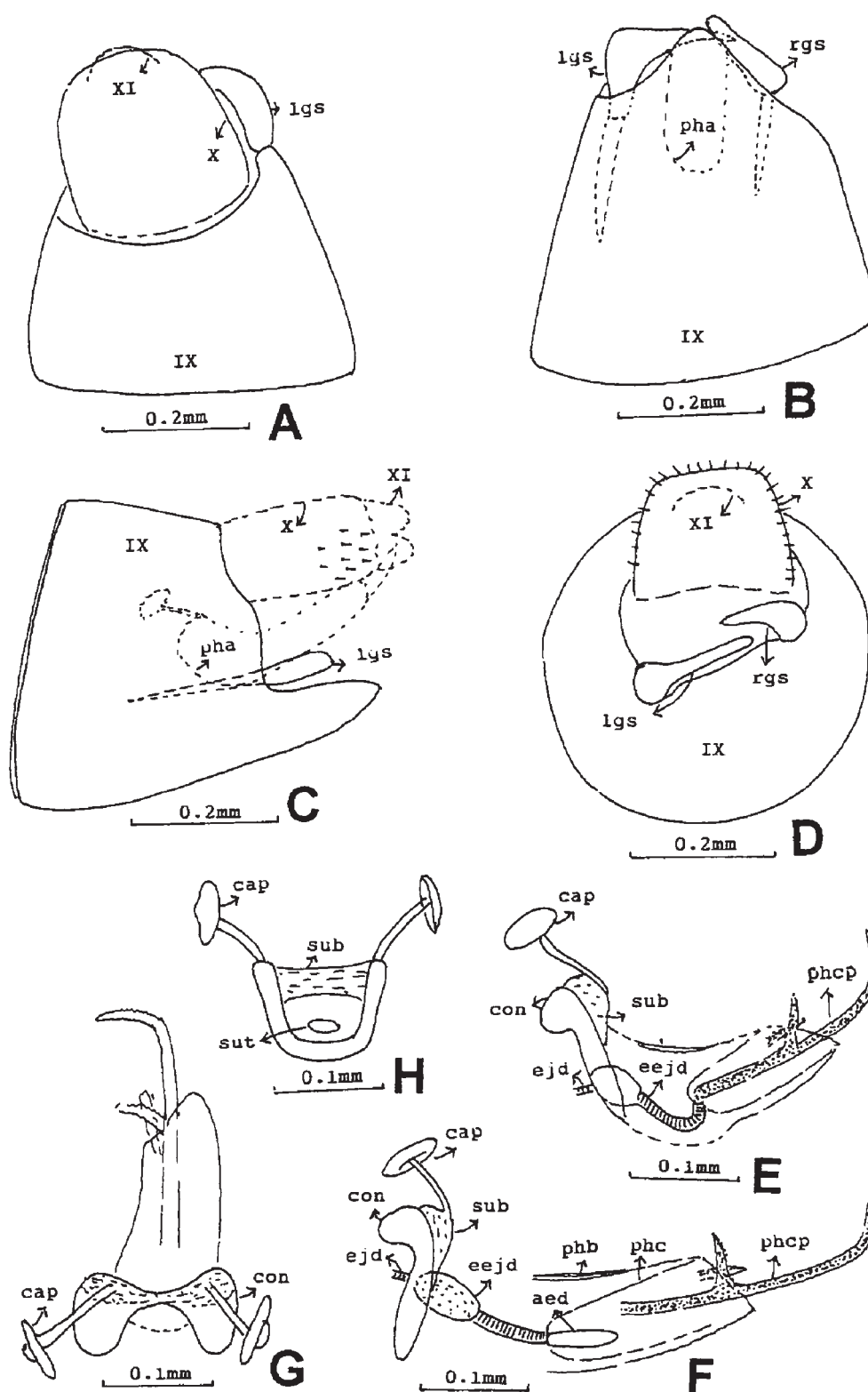


Fig. 53. *Nesidiocoris plebejus*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. aedeagus in complete eversion, lateral view; G. phallus, dorsal view; H. connective, support bridge, and support tube, dorsal view.

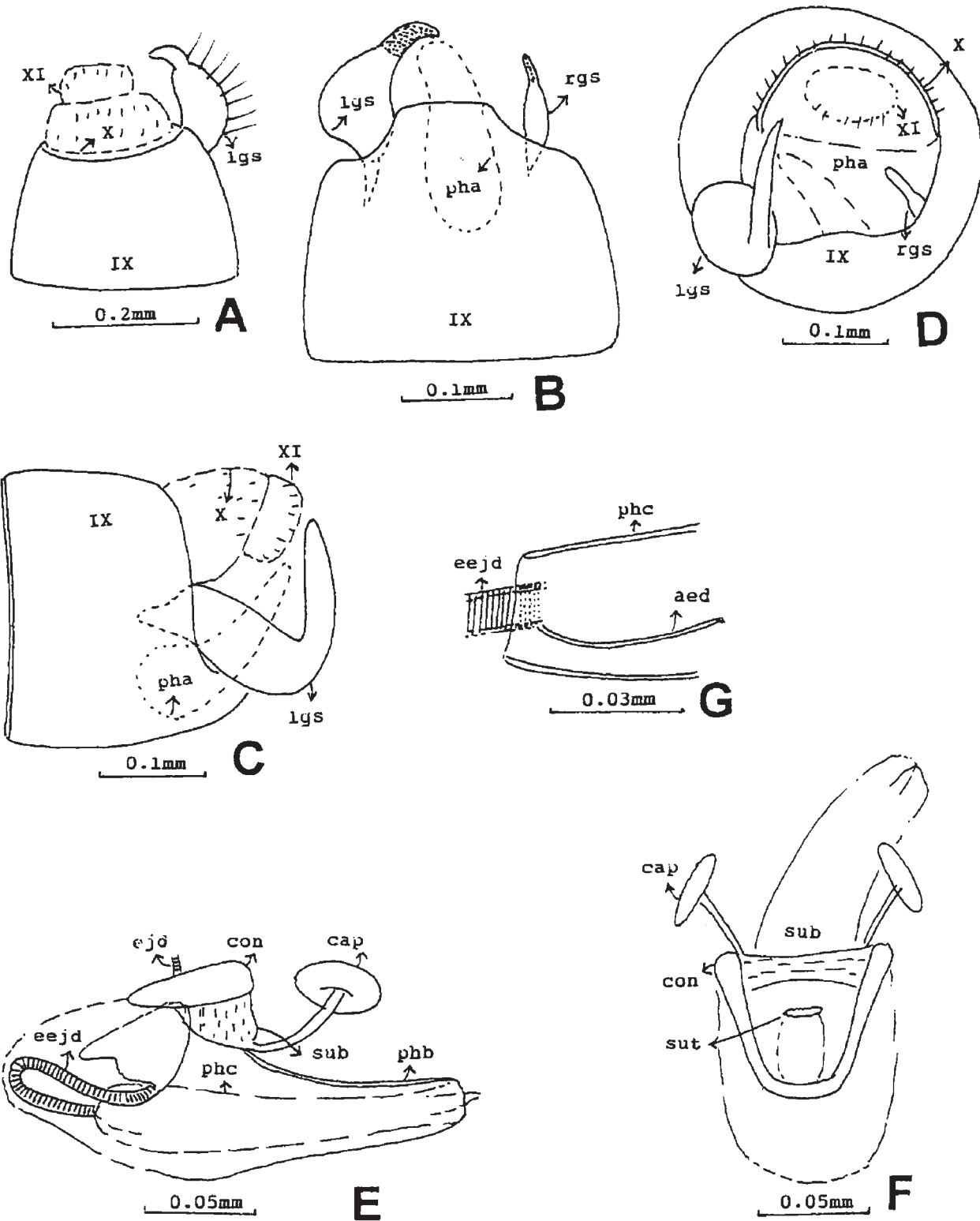


Fig. 54. *Macrolophus glaucescens*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. expanded ejaculatory duct and aedeagus, lateral view.

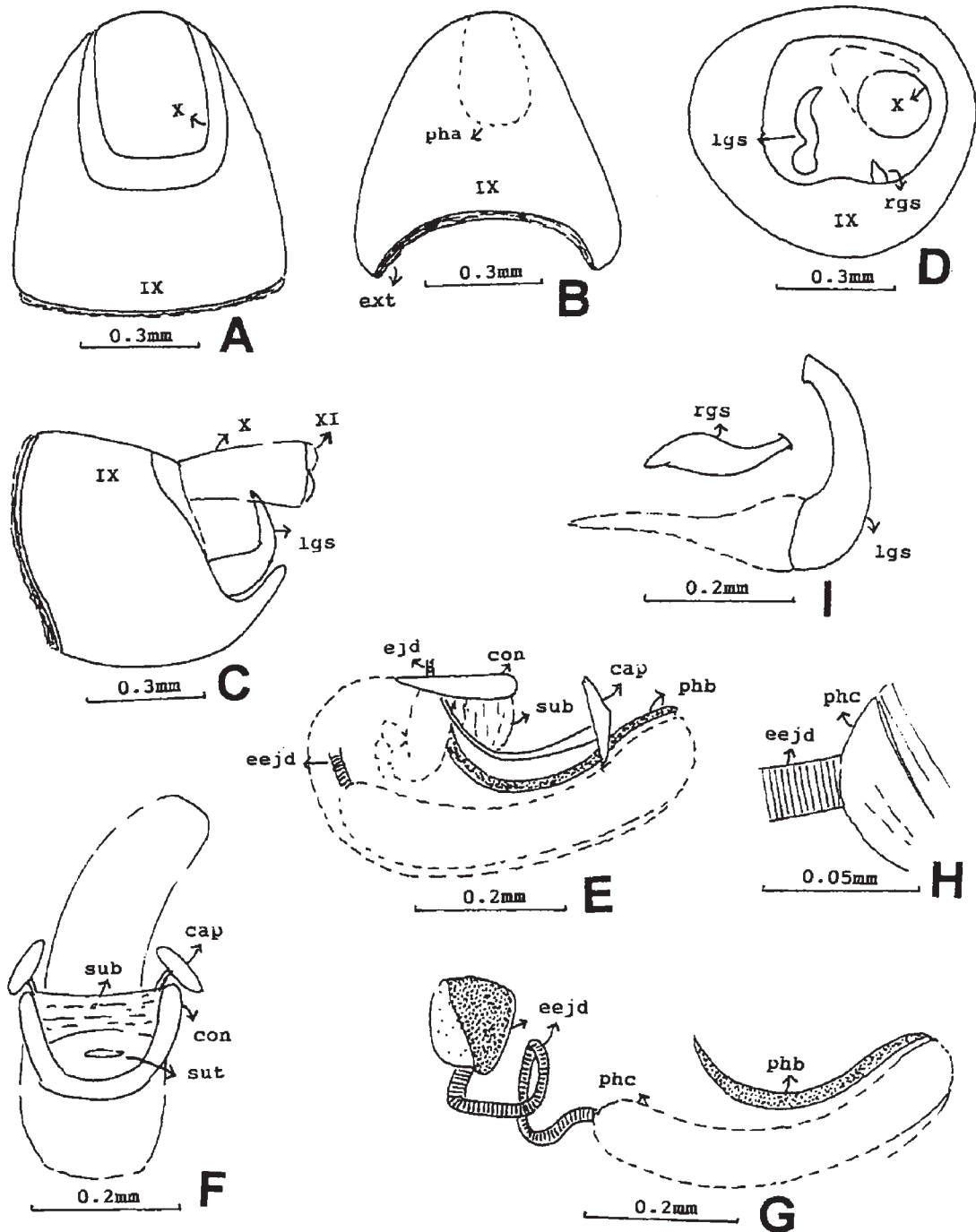


Fig. 55. *Helopeltis cinchonae*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. phallobasal conjunctiva in complete eversion, lateral view; H. apex of expanded ejaculatory duct and base of phallobasal conjunctiva, lateral view; I. genital styles, lateral view.

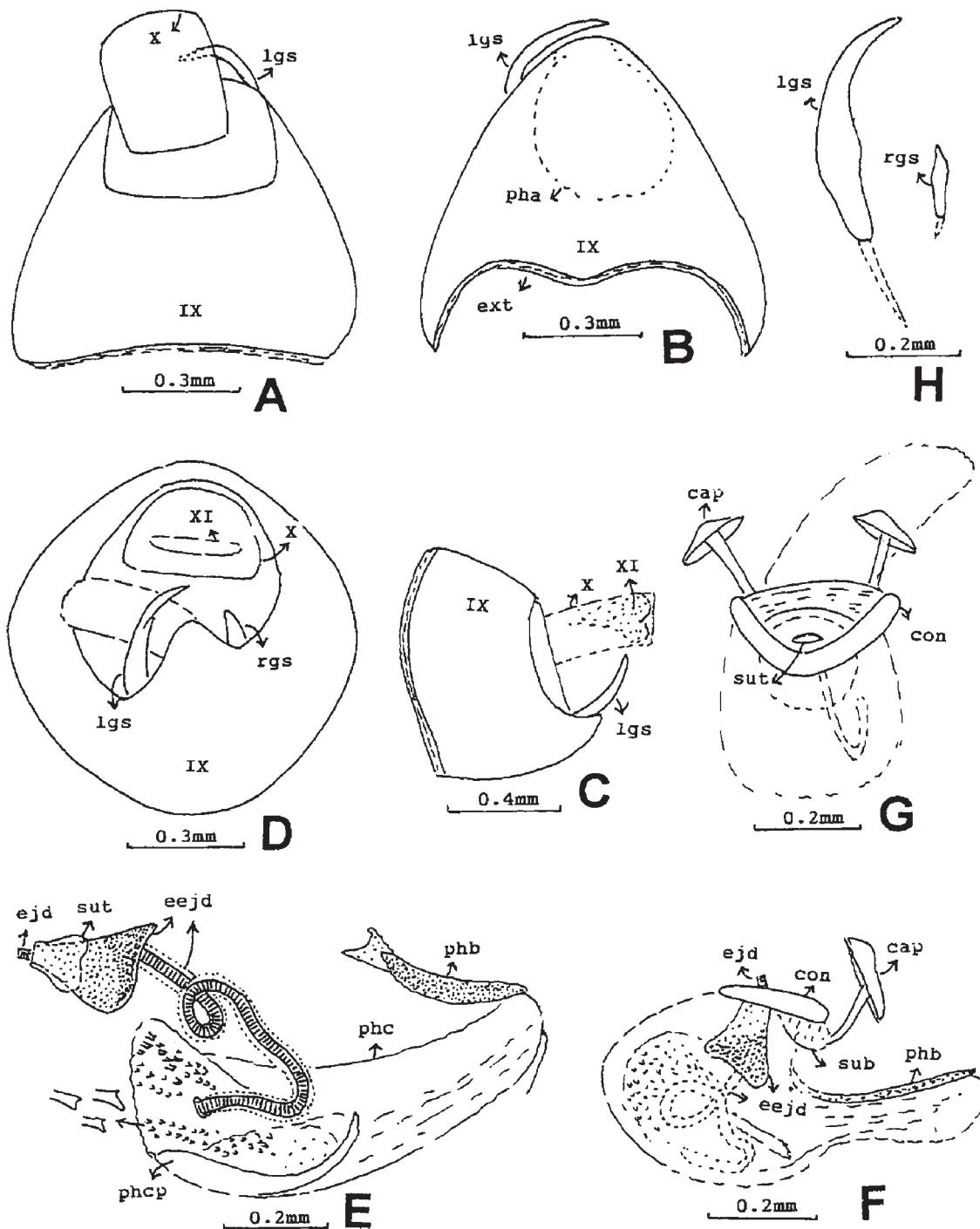


Fig. 56. *Helopeltis fasciaticollis*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. expanded ejaculatory duct and phallobasal conjunctiva in complete eversion, lateral view; F. phallus, lateral view; G. the same, dorsal view; H. genital styles, ventral view.

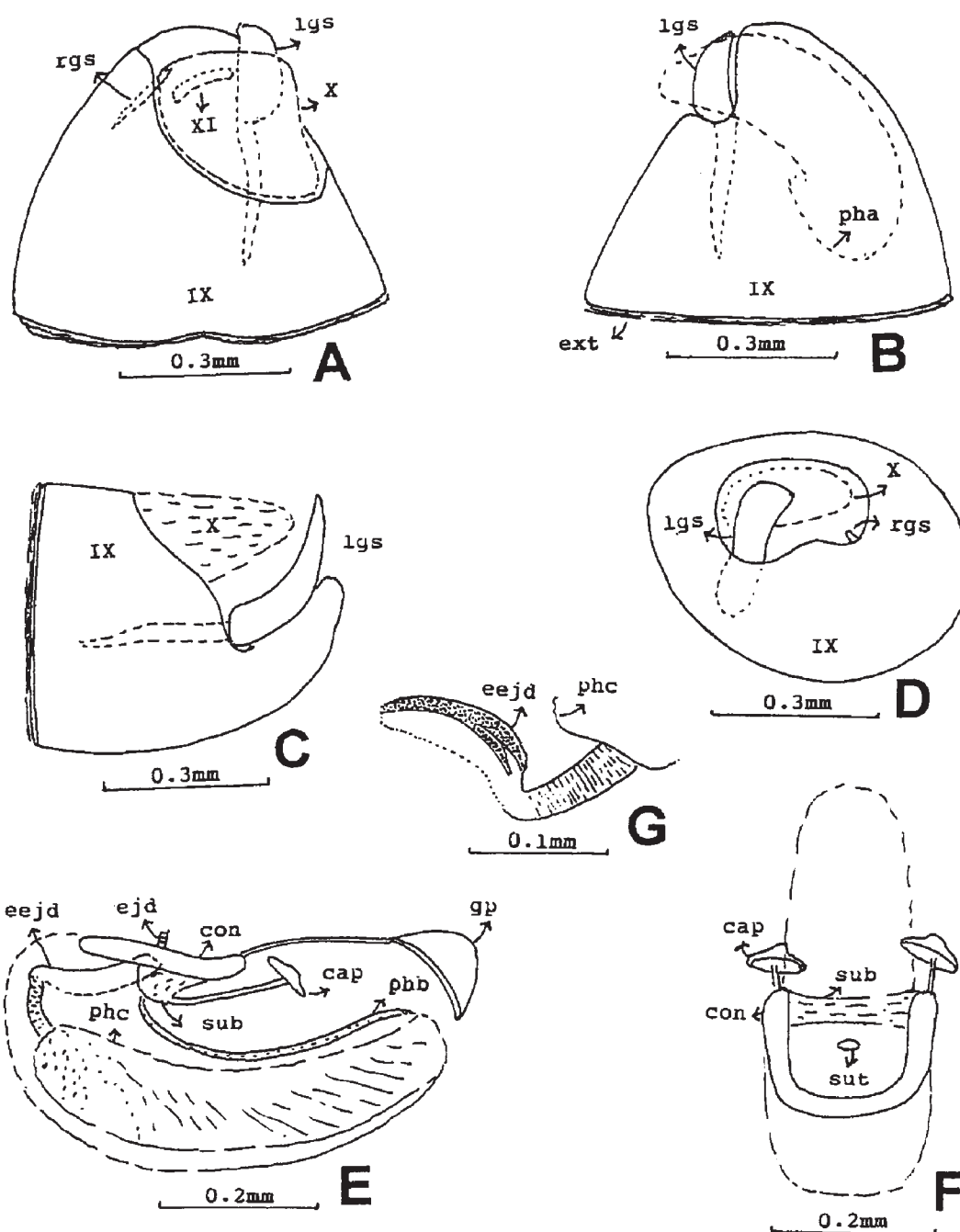


Fig. 57. *Mansoniella formosana*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. expanded ejaculatory duct and phallobasal conjunctiva in complete eversion, lateral view.

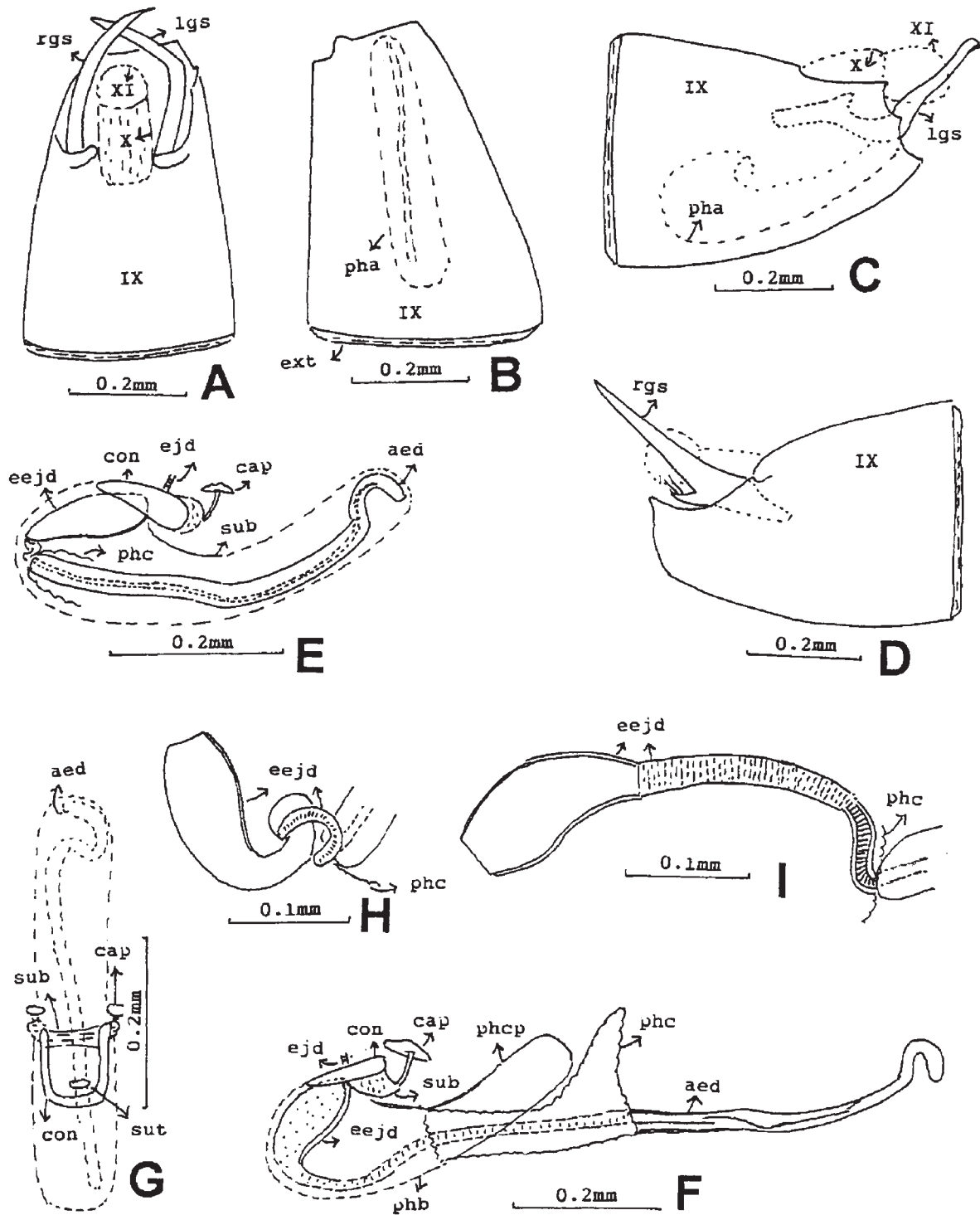


Fig. 58. *Mansonella* sp. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, dorsal view; F. the same, lateral view.

59. *Felisacus longiceps* Poppius, 1915

Fig. 59

Abdominal segment IX with differentiated extension. Apex of abdominal tergite IX 0.73 times width of widest portion; apical margin deeply emarginated. Sternite with asymmetrical apex, truncate. Abdominal segment X elongate. Abdominal segment XI not retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left slightly larger.

Connective complete, U-shaped. Support bridge poorly developed, triangular in lateral view. Capitae processes small. Support tube not upraised. Expanded ejaculatory duct separated into 2 parts; basal part lightly pigmented, not spiraled; basal 2/3 of apical part obscurely spiraled, apical 1/3 distinctly spiraled. Ejaculatory duct within aedeagus visible, as the only exception among the examined Miridae. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctiva in complete eversion, dorsoapical portion of triangle produced dorsocaudad. Phallobasal conjunctival processes exposed in genital chamber differentiated. Aedeagus lengthened, longitudinal membranous, apex arched. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Taitung Co., Lanyu (Orchid I.). 4~9 May 1982. S. C. Lin and C. C. Pan. Det. by C. S. Lin.

60. *Felisacus okinwanus* Miyamoto, 1965

Fig. 60

Abdominal segment IX with differentiated extension. Apex of abdominal tergite IX 0.65 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, near middle acutely produced caudad. Abdominal segment X elongate. Abdominal segment XI not retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on right larger.

Connective complete, U-shaped. Support bridge poorly developed, slender in lateral view. Capitae processes moderately large. Support tube not upraised. Expanded ejaculatory duct separated into 2 parts; basal part oval with heavily pigmented caudal margin, not spiraled; apical part slender, spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival

processes exposed in genital chamber with rod-like dorsal one. Exposed phallobasal conjunctiva differentiated, closely contacting aedeagus, not bulbous. Aedeagus lengthened, longitudinal membranous, apex arched. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Pingtung Co., Renting. 24~28 June 1981. T. Lin and C. C. Pan. Det. by C. S. Lin.

61. *Felisacus gressitti* Miyamoto, 1965

Fig. 61

Abdominal segment IX with rather-broad extension. Apex of abdominal tergite IX 0.74 times width of widest portion; apical margin shallowly emarginated. Sternite with symmetrical apex, roundly produced caudad. Abdominal segment X transverse, situated below abdominal tergite IX. Abdominal segment XI not examined. Genital plates uniformly wide, arched. Genital styles asymmetrical in shape and size, one on left somewhat larger.

Connective complete, U-shaped. Support bridge poorly developed, triangular, small in lateral view. Capitae processes moderately large. Support tube not upraised. Expanded ejaculatory duct separated into 2 parts; basal part rod-like, with heavily pigmented caudal margin, not spiraled; apical part slender, spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, dorsal one very long, narrow. Exposed phallobasal conjunctiva bulbous, 3-lobed, with 3 processes within cavity, surface armed with small, sclerotized, quadrate plates. Aedeagus shortened. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Nantou, Wushe. 17 Aug. 1984. K. C. Chou. Det. by C. S. Lin.

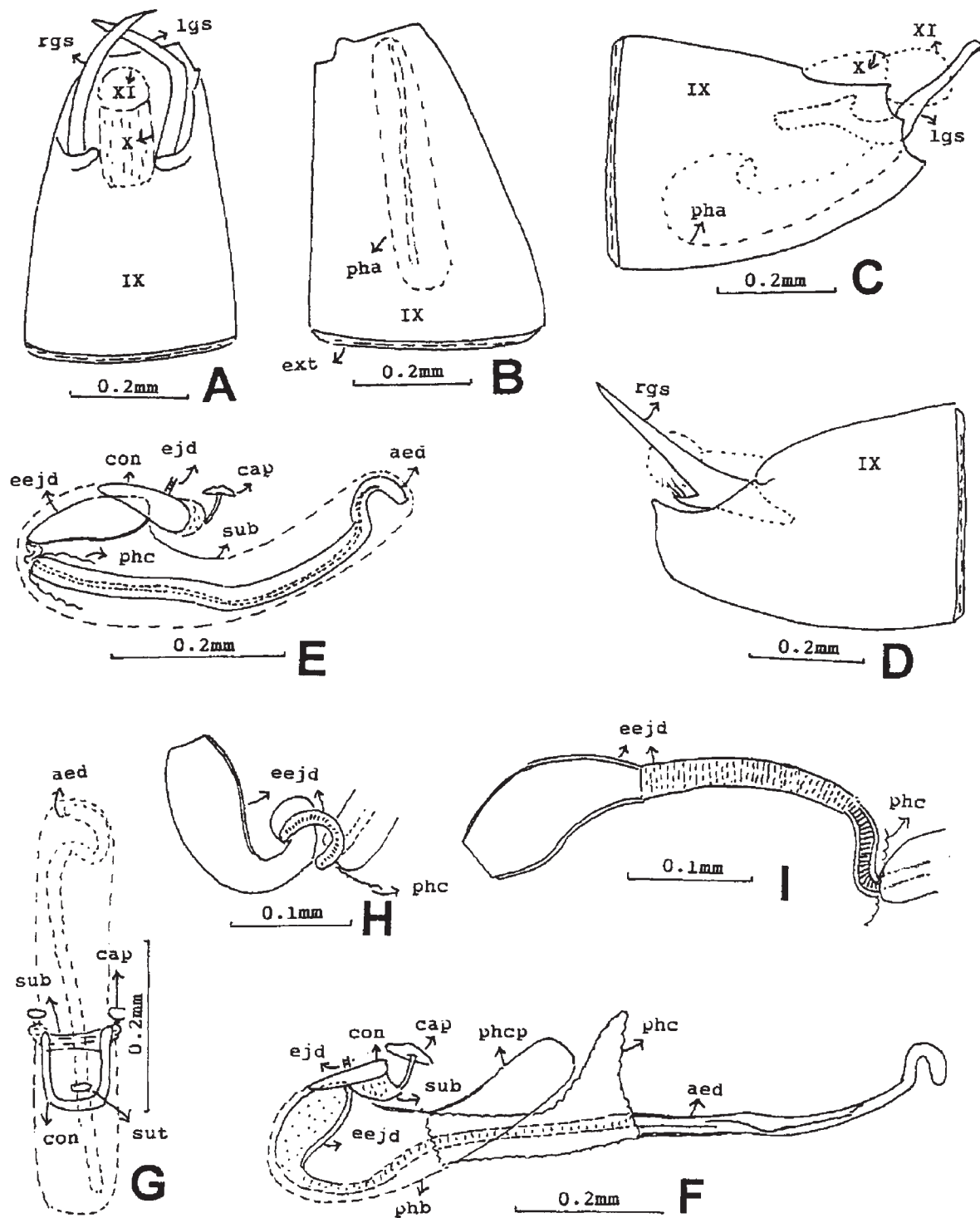


Fig. 59. *Felisacus longiceps*. A. Abdominal segments IX-XI and genital styles, dorsal view; B. the same, ventral view; C. the same, left lateral view; D. the same, right lateral view; E. phallus, lateral view; F. the same, aedeagus in complete eversion, lateral view; G. the same, dorsal view; H. expanded ejaculatory duct in a reposed condition; I. the same, in an everted condition.

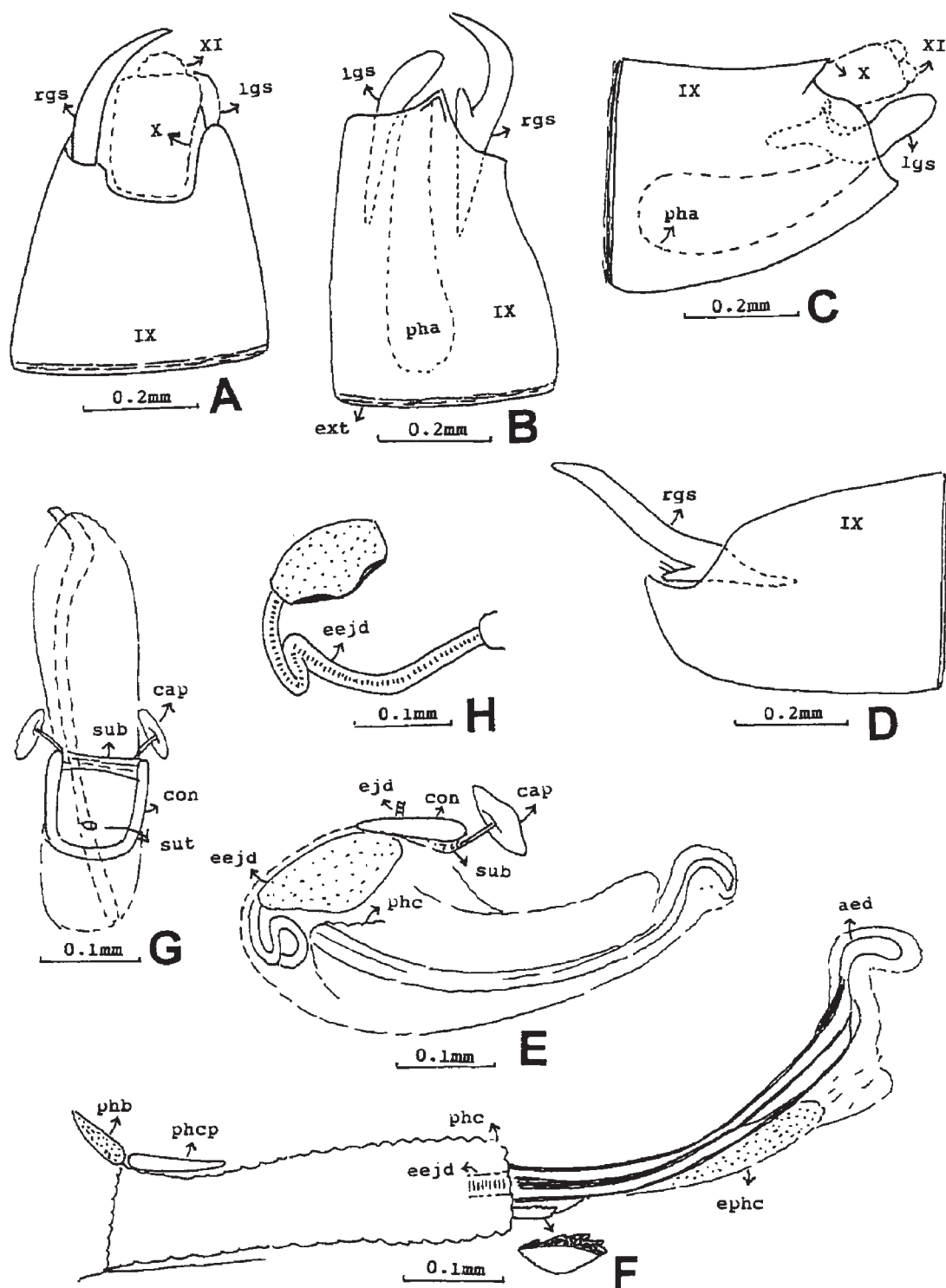


Fig. 60. *Felisacus okinawanus*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, left lateral view; D. the same, right lateral view; E. phallus, lateral view; F. aedeagus in complete eversion, lateral view; G. phallus, dorsal view; H. expanded ejaculatory duct in complete eversion, lateral view.

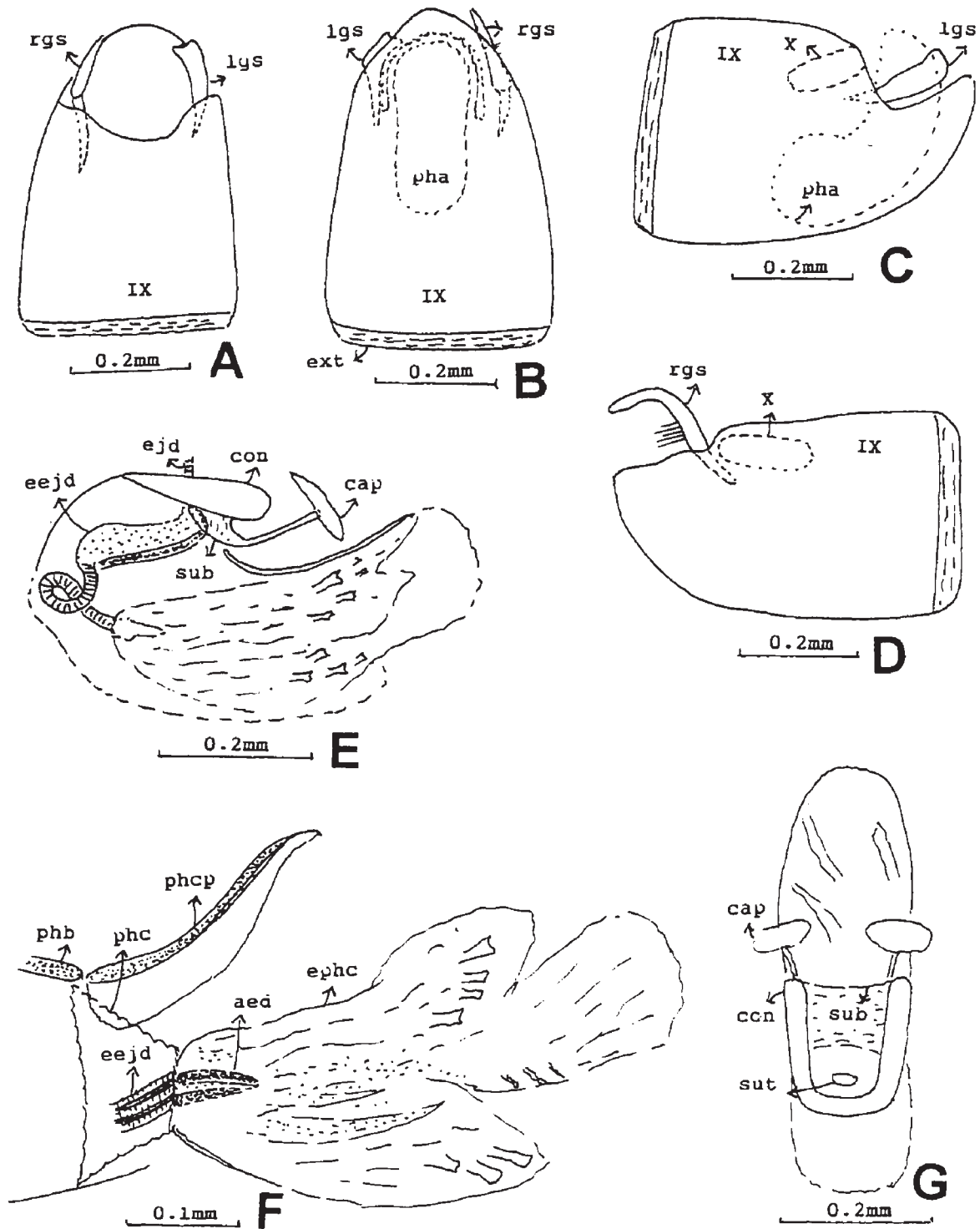


Fig. 61. *Felisacus gressitti*. A. Abdominal segment IX and genital styles, dorsal view; B. the same, ventral view; C. the same, left lateral view; D. the same, right lateral view; E. phallus, lateral view; F. aedeagus in complete eversion, lateral view; G. phallus, dorsal view.

62. *Felisacus insularis* Miyamoto, 1965

Fig. 62

Abdominal segment IX with rather-broad extension, rotated clockwise 90°. Apex of abdominal tergite IX 0.85 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, left narrow line notched. Abdominal segment X transverse, situated below abdominal tergite IX. Abdominal segment XI not examined. Genital plates arched, uniform width. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge poorly developed, large and triangular in lateral view. Capitate processes moderately large. Support tube slightly upraised. Expanded ejaculatory duct separated into 2 parts; basal part elongate quadrate, margins heavily pigmented, not spiraled; apical part slender, obscurely spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, dorsal one broad, slightly narrower than apex of phallobase. Exposed phallobasal conjunctiva bulbous, with 6 or 7 processes within cavity. Aedeagus extremely shortened, ring-like. Gonopore defined.

Specimen examined: 1 male. Taiwan: Nantou Co., Tungpu. 22~25 Nov. 1982. K. C. Chou and S. P. Huang. Det. by C. S. Lin.

63. *Dicyphus orientalis* Reuter, 1879

Fig. 63

Abdominal segment IX with differentiated extension. Apex of abdominal tergite IX 0.34 times width of widest portion; apical margin deeply emarginated. Sternite with symmetrical apex, broad, roundly produced caudad. Abdominal segment X transverse, directed to left and laterocaudad. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge poorly developed, large, triangular in lateral view. Capitate processes small. Support tube not upraised. Expanded ejaculatory duct separated into 2 parts; basal part rod-like, lightly pigmented, not spiraled; apical part rather broad, spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, dorsal one

larger, about 1/2 height of apex of phallobase. Exposed phallobasal conjunctiva bulbous, without appendages within cavity. Aedeagus shortened, membranous. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Taichung, Chiapaotai. 14~18 Oct. 1980. K. S. Lin and C. H. Wang. Det. by C.S. Lin.

64. *Nesidiocoris tenuis* (Reuter, 1895)

Fig. 64

Abdominal segment IX rotated counterclockwise 90°, extension differentiated. Medially apex of abdominal tergite IX acutely produced caudad. Sternite at apex asymmetrical, forming 2 processes. Abdominal segment X transverse, situated below abdominal tergite IX. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge poorly developed, rather large, triangular in lateral view. Capitate processes moderately large. Support tube not upraised. Expanded ejaculatory duct separated into 2 parts; basal part small, not spiraled; apical part very long, spiraled, its apical part deeply invaginated into exposed phallobasal conjunctiva cavity. Both phallobase and phallobasal conjunctiva shortened. Phallobase with sclerotized and pigmented apex. Phallobasal conjunctival processes exposed in genital chamber narrow, dorsal one slightly larger than ventral one. Exposed phallobasal conjunctiva bulbous, with plicae at base and cuticular spots at apex. Aedeagus and gonopore wholly reduced.

Specimen examined: 1 male. China: Fujian Prov., Zhangzhou. 14 June 1955. Liang Chen Wang.

65. *Cyrtopeltis* sp.

Fig. 65

Abdominal segment IX with differentiated extension. Apex of abdominal tergite IX 0.78 times width of the widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, right submedian portion rod-like and produced caudad. Abdominal segment X transverse, situated below abdominal tergite IX. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support

bridge poorly developed, triangular in lateral view. Capitae processes moderately large. Support tube somewhat [?]upper. Expanded ejaculatory duct separated into 2 parts; basal part stout, not spiraled; apical part slender, spiraled, its end connected to exposed phallobasal conjunctiva at side, not bottom. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, dorsal one sclerotized and pigmented, rod-like. Exposed phallobasal conjunctiva bulbous, very long, with 3 areas of densely armed cuticular spots. Aedeagus and gonopore wholly reduced.

Specimen examined: 1 male. Taiwan: Hsinchu, Chingtsaofu. 13 Mar. 1989. K. W. Huang. Det. by C. S. Lin.

(14) Tribe Eccritotarsini

66. *Ernestinus pallidiscutum* (Poppius, 1915)

Fig. 66

Apex of abdominal tergite IX 0.79 times width of widest portion; apical margin deeply emarginated. Sternite with seemingly symmetrical apex, truncated, right submarginal portion cone-shaped and produced caudad. Abdominal segment X transverse. Abdominal segment XI not retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on right larger.

Connective complete, V-shaped. Support bridge poorly developed, strip-shaped above arm of connective in lateral view. Capitae processes small. Support tube not upraised. Expanded ejaculatory duct separated into 2 parts; basal part elongate ovate, not spiraled; apical part slender, spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Aedeagus moderately long, stiff. Gonopore difficult to recognize.

Specimens examined: 2 males. Taiwan: Nantou, Tungpu. Nov. 1985. K. S. Lin. Det. by C. S. Lin.

67. *Prodromus clypeatus* Distant, 1904

Fig. 67

Apex of abdominal tergite IX 0.41 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, right 1/2 broad and roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI not retracted into segment X. Genital

plates arched, uniformly wide. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge poorly developed, dorsolateral portions winged, directed cephalad. Capitae processes small. Support tube not upraised. Expanded ejaculatory duct separated into 2 parts; basal part converging to apex, not spiraled; apical part broad, spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber differentiated, dorsal one broad at base. Exposed phallobasal conjunctiva bulbous, apex expanded. Aedeagus moderately long. Gonopore defined, with transverse ridges.

Specimen examined: 1 male. Taiwan: Taipei Co., Tachichiao. 20 Aug. 1987. I. C. Hsu. Det. by C. S. Lin.

(15) Tribe Bryocorini

68. *Bryocoris flaviceps* Zheng et Liu, 1992

Fig. 68

Abdominal segment IX with acutely produced apical margin caudad in dorsal view; dorsoventral elongate quadrate in lateral view; posterior opening directed ventrocaudad. Abdominal segment X transverse, situated below abdominal tergite IX. Abdominal segment XI not examined. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge poorly developed, dorsolateral portions winged, directed cephalad. Capitae processes wholly reduced. Support tube somewhat upraised. Expanded ejaculatory duct not separated into 2 parts, gradually diverging to apex, lightly pigmented, not spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Aedeagus lengthened, extending to apex of phallobase, pigmented, stiff. Gonopore difficult to recognize.

Specimen examined: 1 male. China: Sichuan Prov., Emei. 19 June 1957. Le-yi Zheng and Hanhua Cheng.

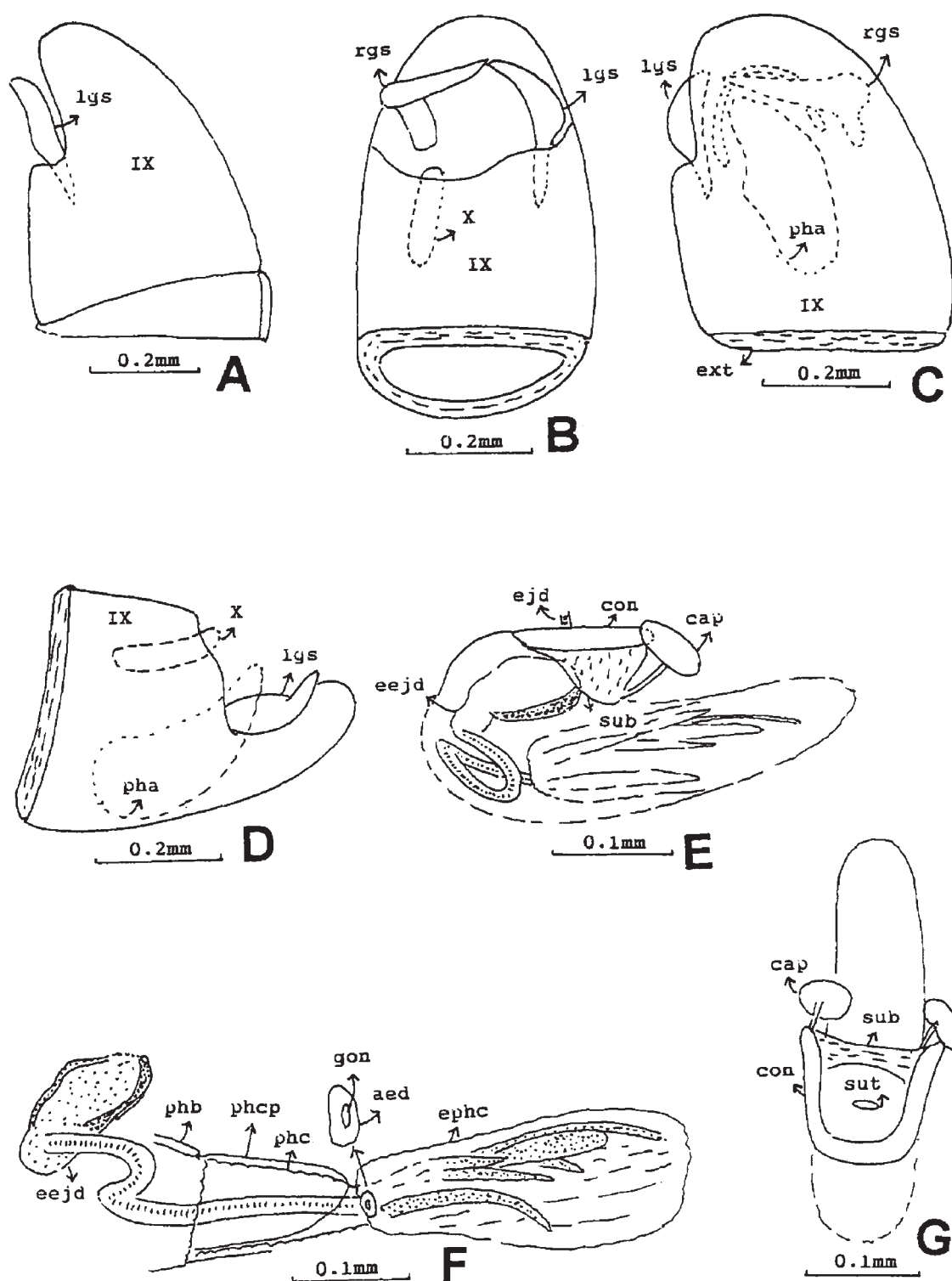


Fig. 62. *Felisacus insularis*. A. Abdominal segments VIII~IX and genital styles, dorsal view; B. abdominal segments IX and X, morphological dorsal view; C. the same, morphological ventral view; D. the same, morphological lateral view; E. phallus, lateral view; F. aedeagus in complete eversion, lateral view; G. phallus, dorsal view.

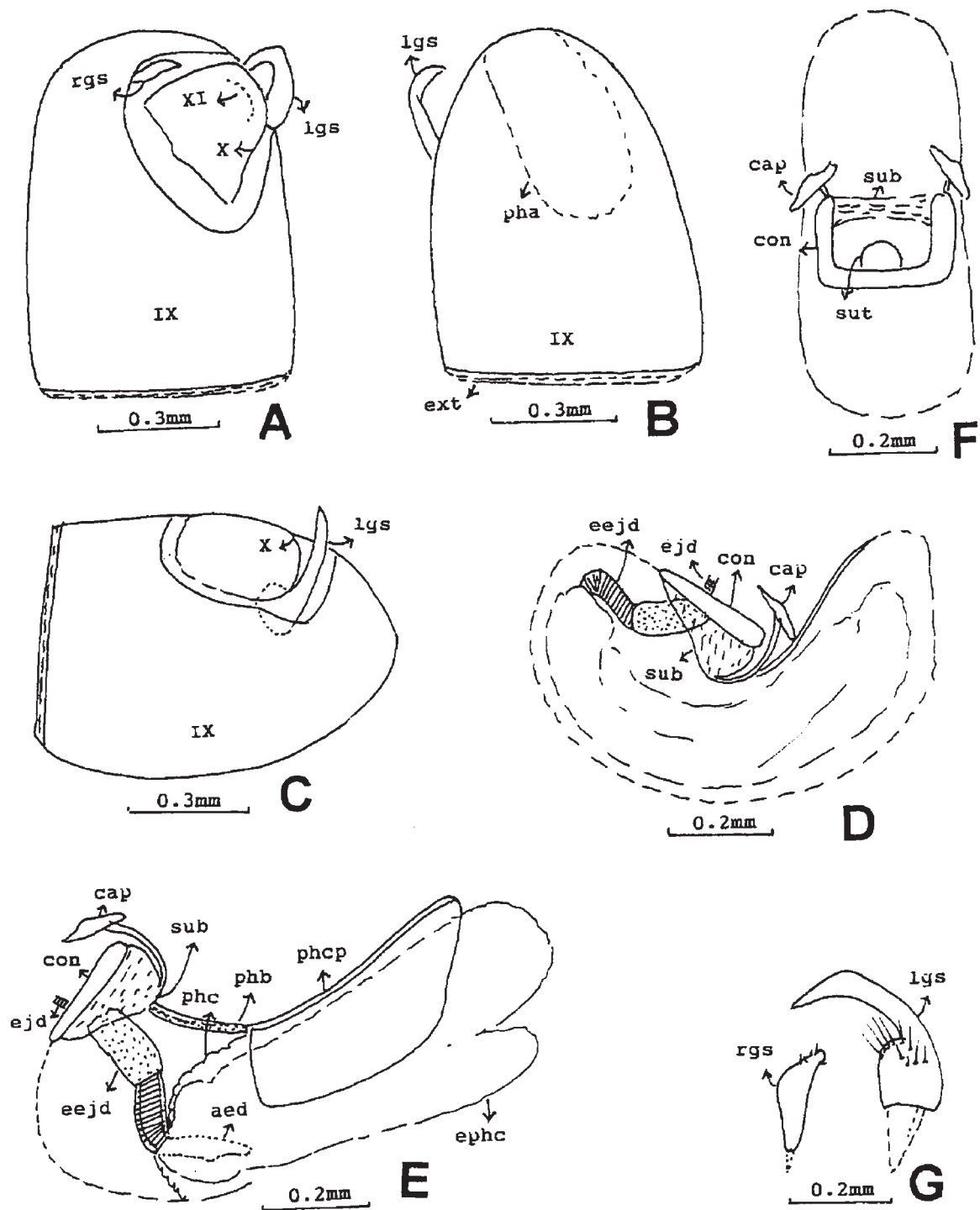


Fig. 63. *Dicyphus orientalis*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. phallus, lateral view; E. aedeagus in complete eversion, lateral view; F. phallus, dorsal view; G. genital styles, dorsal view.

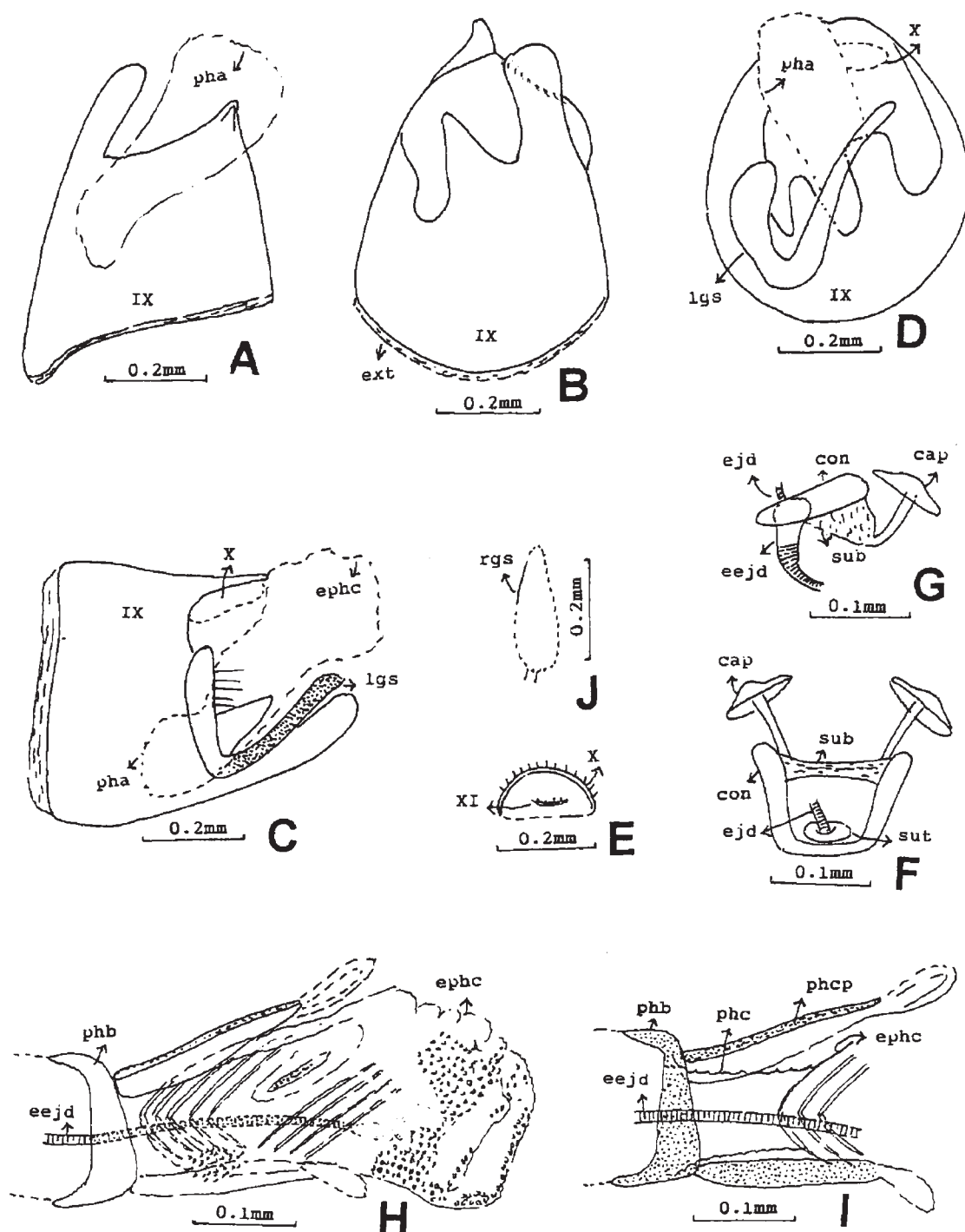


Fig. 64. *Nesidiocoris tenuis*. A. Abdominal segment IX, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, ventral view; E. abdominal segments X and XI, caudal view; F. connective, support bridge, and support tube, dorsal view; G. the same, lateral view; H. expanded ejaculatory duct in complete eversion, lateral view; I. phallobasal conjunctiva in complete eversion, lateral view; J. aedeagus, dorsal view.

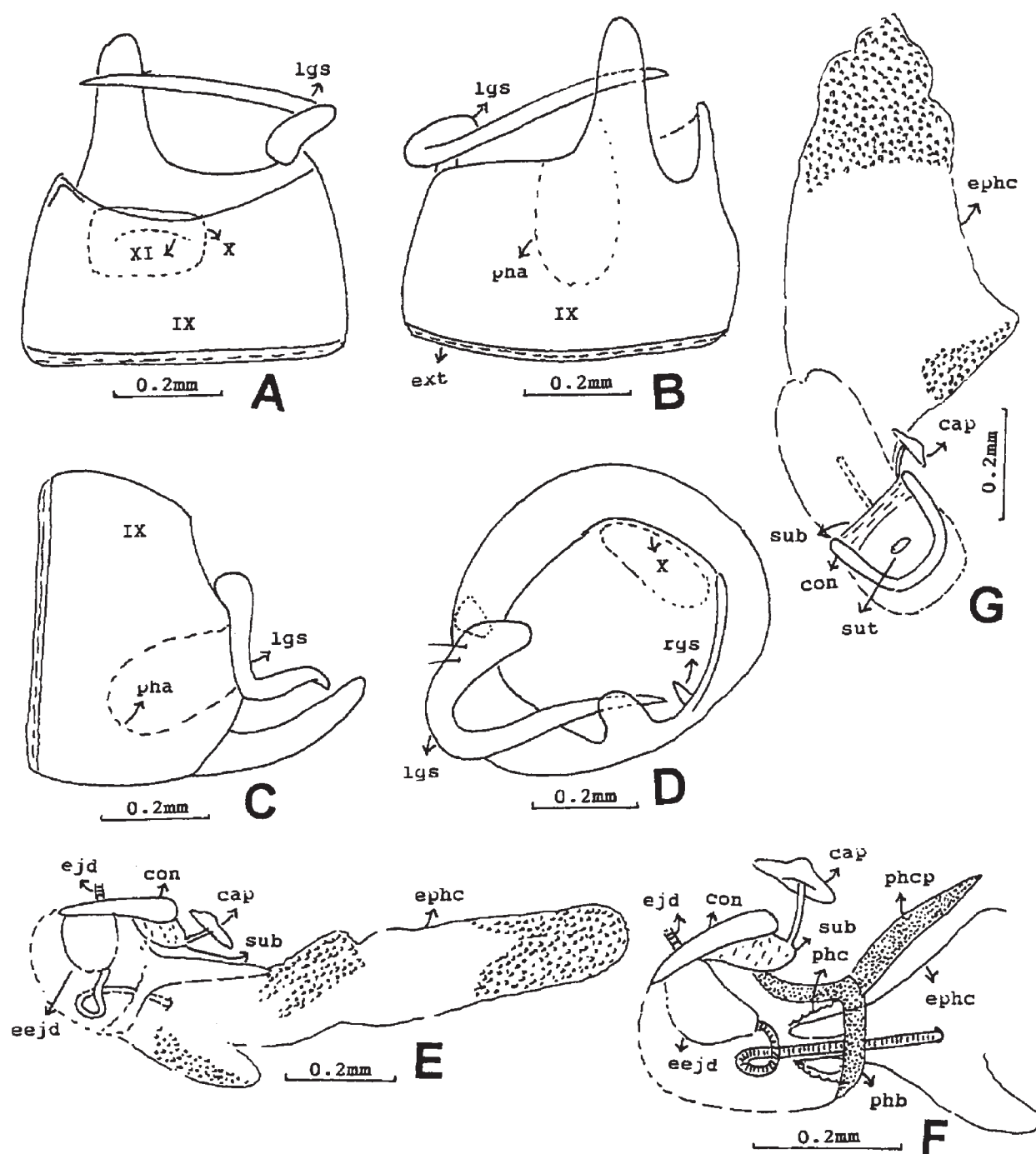


Fig. 65. *Cyrtopeltis* sp. A. Abdominal segments IX-XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus in eversion, lateral view; F. phallobasal conjunctiva, lateral view; G. phallus in eversion, dorsal view.

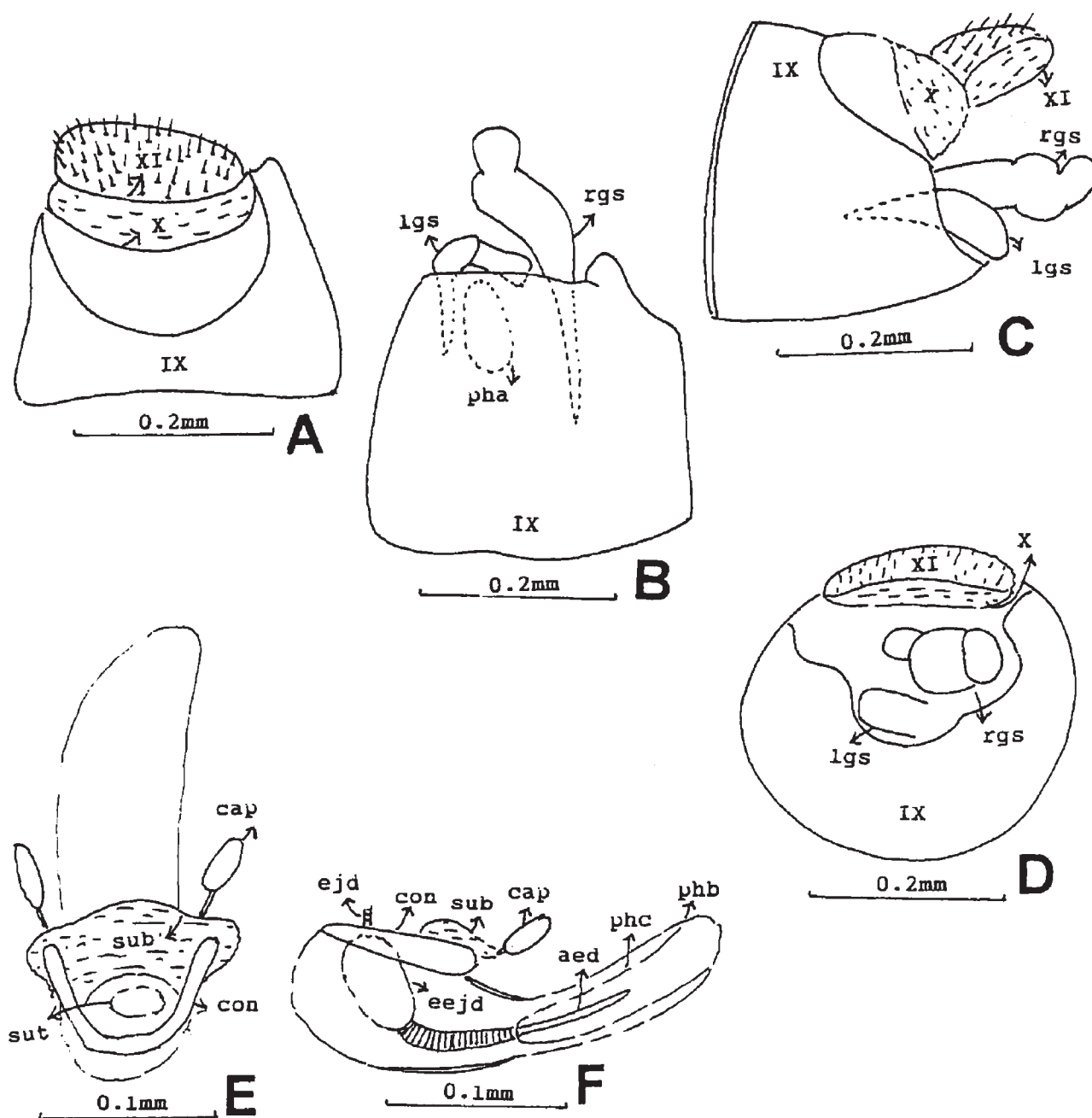


Fig. 66. *Ernestinus pallidiscutum*. A. Abdominal segments IX-XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, dorsal view; F. the same, lateral view.

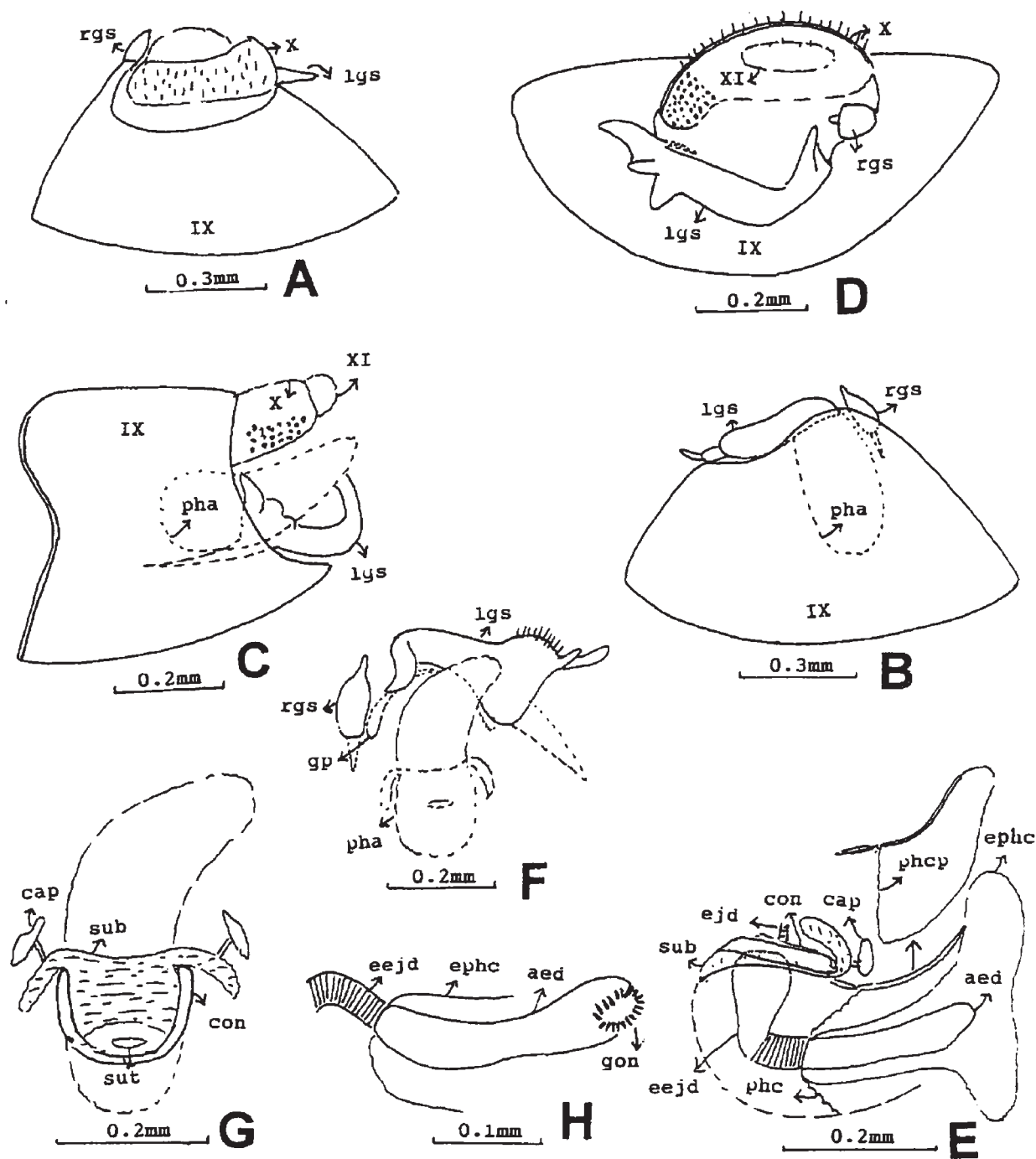


Fig. 67. *Prodrormus clypeatus*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. phallus and genital styles, dorsal view; G. phallus, dorsal view; H. aedeagus, lateral view.

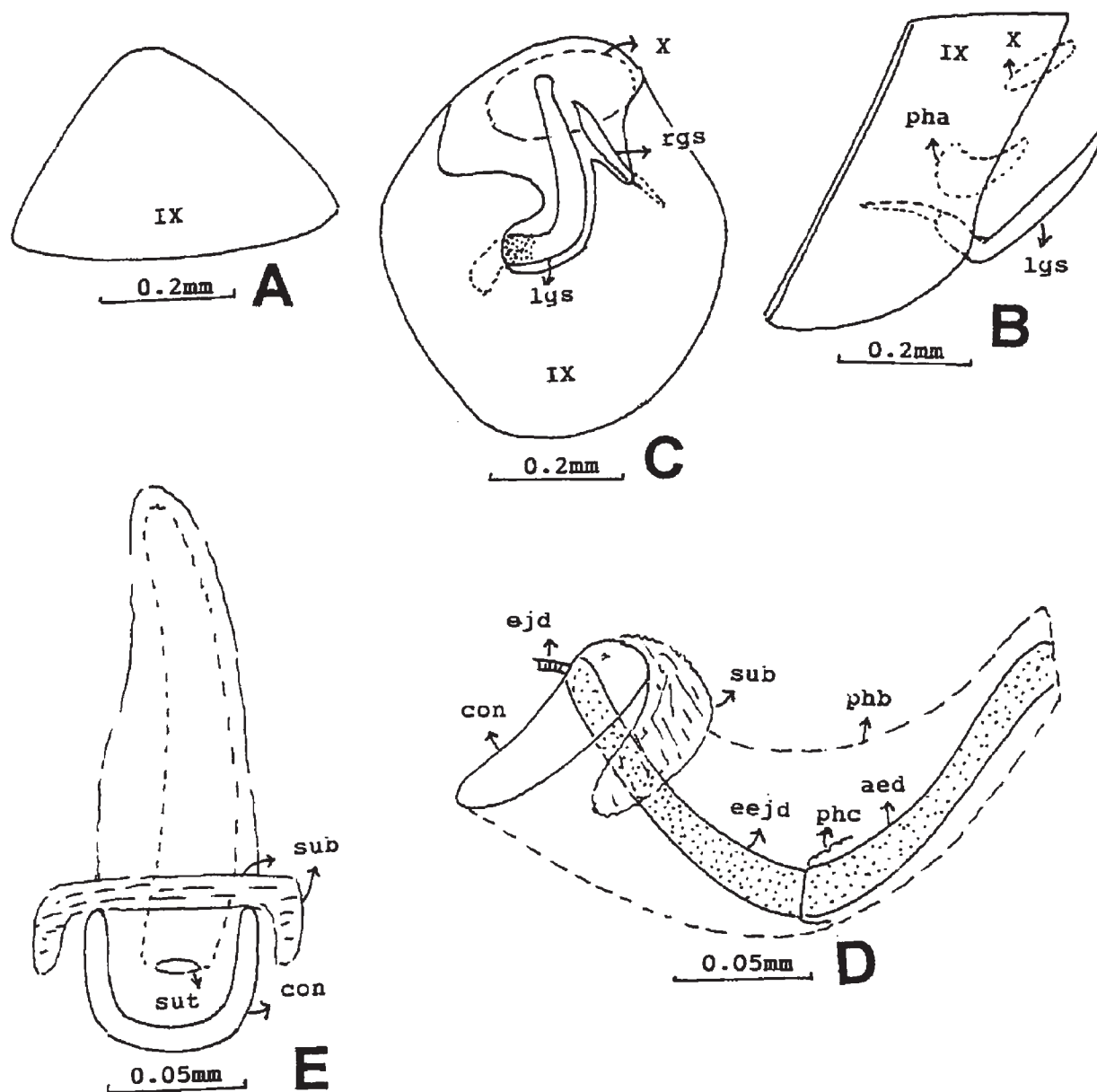


Fig. 68. *Bryocoris flaviceps*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, lateral view; C. the same, caudal view; D. phallus, lateral view; E. the same, dorsal view.

69. *Hekista novitius* (Distant, 1904)

Fig. 69

Abdominal segment IX with produced apical margin caudad in dorsal view; dorsoventral elongate quadrate in lateral view; posterior opening directed ventrocaudad. Abdominal segment X transverse, situated below abdominal tergite IX. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connected complete, U-shaped. Support bridge poorly developed, dorsolateral portions winged, directed cephalad. Capitae processes wholly reduced. Support tube not upraised. Expanded ejaculatory duct not separated into 2 parts, stout, L-shaped, not spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Aedeagus lengthened, extending to apex of phallobase, rather broad, dorsal portion heavily pigmented. Gonopore difficult to recognize.

Specimens examined: 3 males. Taiwan: Hualien Co., Tayuling. 6~9 Sept. 1983. L. T. Chou and K. C. Chou. Det. by C. S. Lin.

70. *Monalocoris pallipes* Carvalho, 1981

Fig. 70

Abdominal segment IX with obliquely truncated apical margin in dorsal view; left rather shallowly emarginated; dorsoventral elongate quadrate in lateral view; posterior opening directed ventrocaudad. Abdominal segment X transverse, situated below abdominal tergite IX. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge poorly developed, dorsolateral portions winged, directed cephalad. Capitae processes wholly reduced. Expanded ejaculatory duct not separated, rod-like, heavily pigmented, not spiraled. Neither phallobase nor phallobasal conjunctiva shortened. Aedeagus lengthened, membranous, extending nearly to apex of phallobase, dorsal margin sinuate. Gonopore difficult to recognize.

Specimens examined: 3 males. Taiwan: Hualien Co., Tayuling. 6~9 Sept. 1983. L. Y. Chou and K. C. Chou. Det. by C. S. Lin.

71. *Monalocoris nigrus* Carvalho, 1981

Fig. 71

Abdominal segment IX with broad apical margin roundly produced caudad in dorsal view; dorsoventral elongate quadrate in lateral view; posterior opening directed ventrocaudad. Abdominal segment X transverse, situated below abdominal tergite IX. Abdominal segment XI retracted into segment X. Genital plate arched, uniformly wide. Genital styles asymmetrical in shape and size, one on left slightly larger.

Connective complete, U-shaped. Support bridge poorly developed, dorsolateral portions winged, directed cephalad. Capitae processes wholly reduced. Support tube somewhat [?]upper. Expanded ejaculatory duct and aedeagus not examined.

Specimens examined: 3 males. Taiwan: Nantou Co., Tungpu. 20~24 Apr. 1982. T. Lin and K. C. Chou. Det. by C. S. Lin.

Remarks on Description of the Bryocorinae

Abdominal segment IX with completely fused tergite and sternite; dorsoventral either not elongate quadrate in lateral view or elongate quadrate; its posterior opening either not directed ventrocaudad or directed ventrocaudad; extension of anterior margin either undifferentiated or differentiated; its surface either with or without a process. Abdominal segment X transverse or elongate; either directed caudad or to left and laterocaudad; situated either after abdominal tergite IX or below abdominal tergite IX. Genital styles asymmetrical in shape and size, either left one or right one larger.

Connective either complete or with transverse portion reduced. Support bridge poorly developed, if winged, directed cephalad. Capitae processes either differentiated or reduced. Expanded ejaculatory duct either separated into 2 parts; basal part variable in form, not spiraled; apical part spiraled; or not separated into 2 parts, not spiraled. Sheath undifferentiated. Phallobase and phallobasal conjunctiva either not shortened or shortened. Phallobasal conjunctival processes exposed in genital chamber either undifferentiated or differentiated. Exposed phallobasal conjunctiva either undifferentiated or differentiated. Aedeagus either moderately long, lengthened, shortened, or wholly reduced. Gonopore either difficult to recognize, defined, with transverse ridges, or wholly reduced.

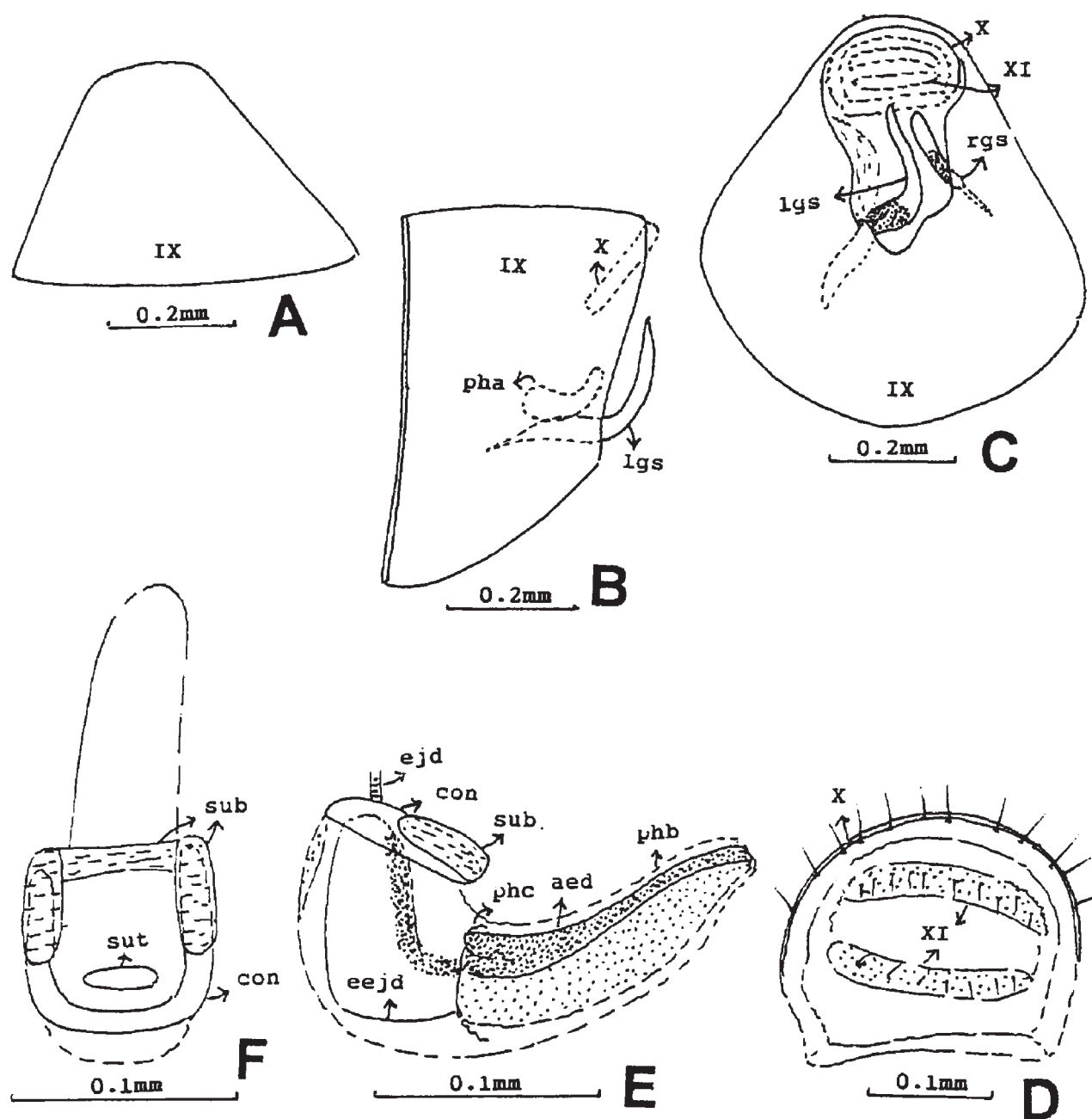


Fig. 69. *Hekista novitius*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, lateral view; C. the same, caudal view; D. abdominal segments X and XI, caudal view; E. phallus, lateral view; F. the same, dorsal view.

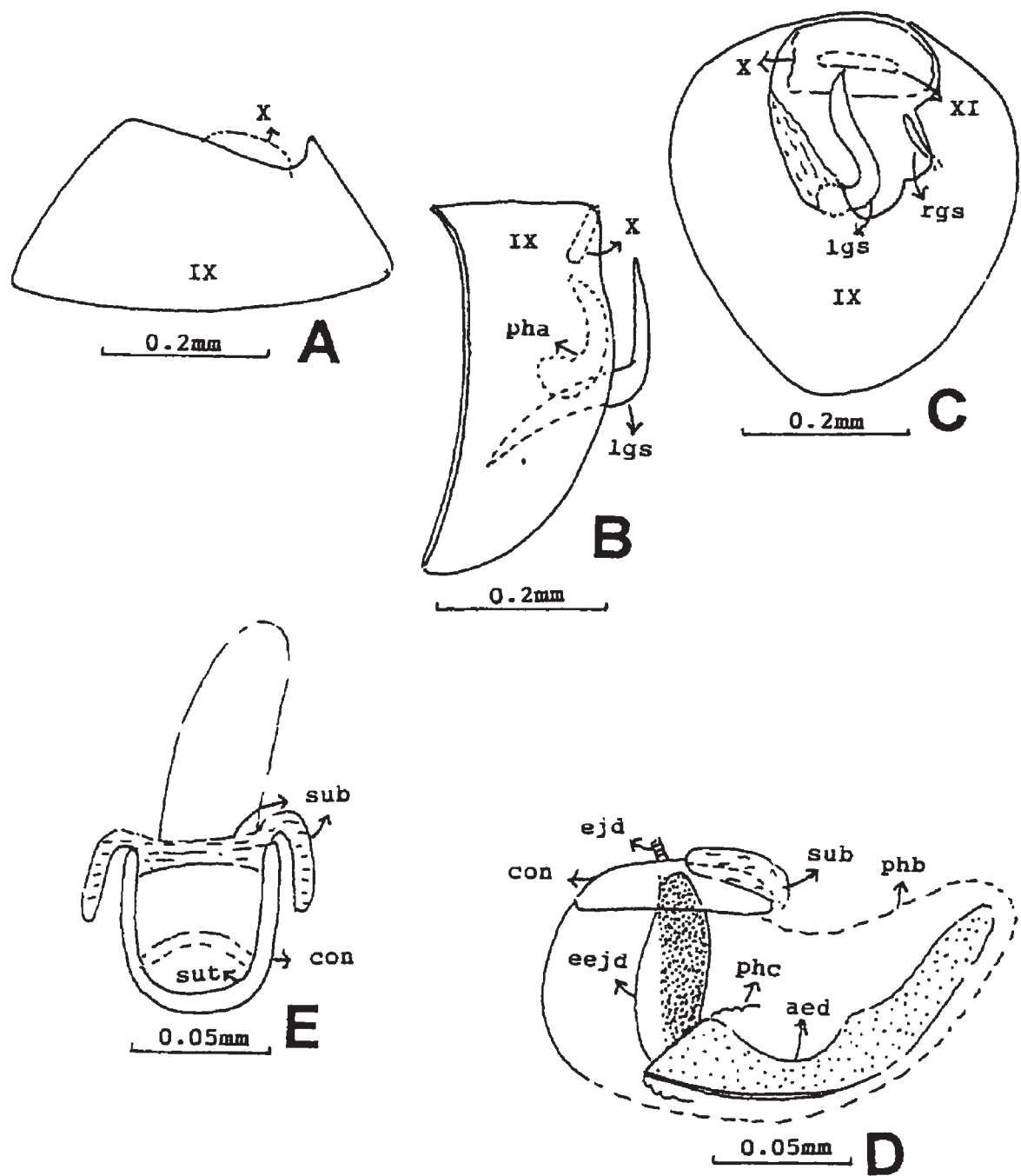


Fig. 70. *Monalocoris pallipes*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, lateral view; C. the same, caudal view; D. phallus, lateral view; E. the same, dorsal view.

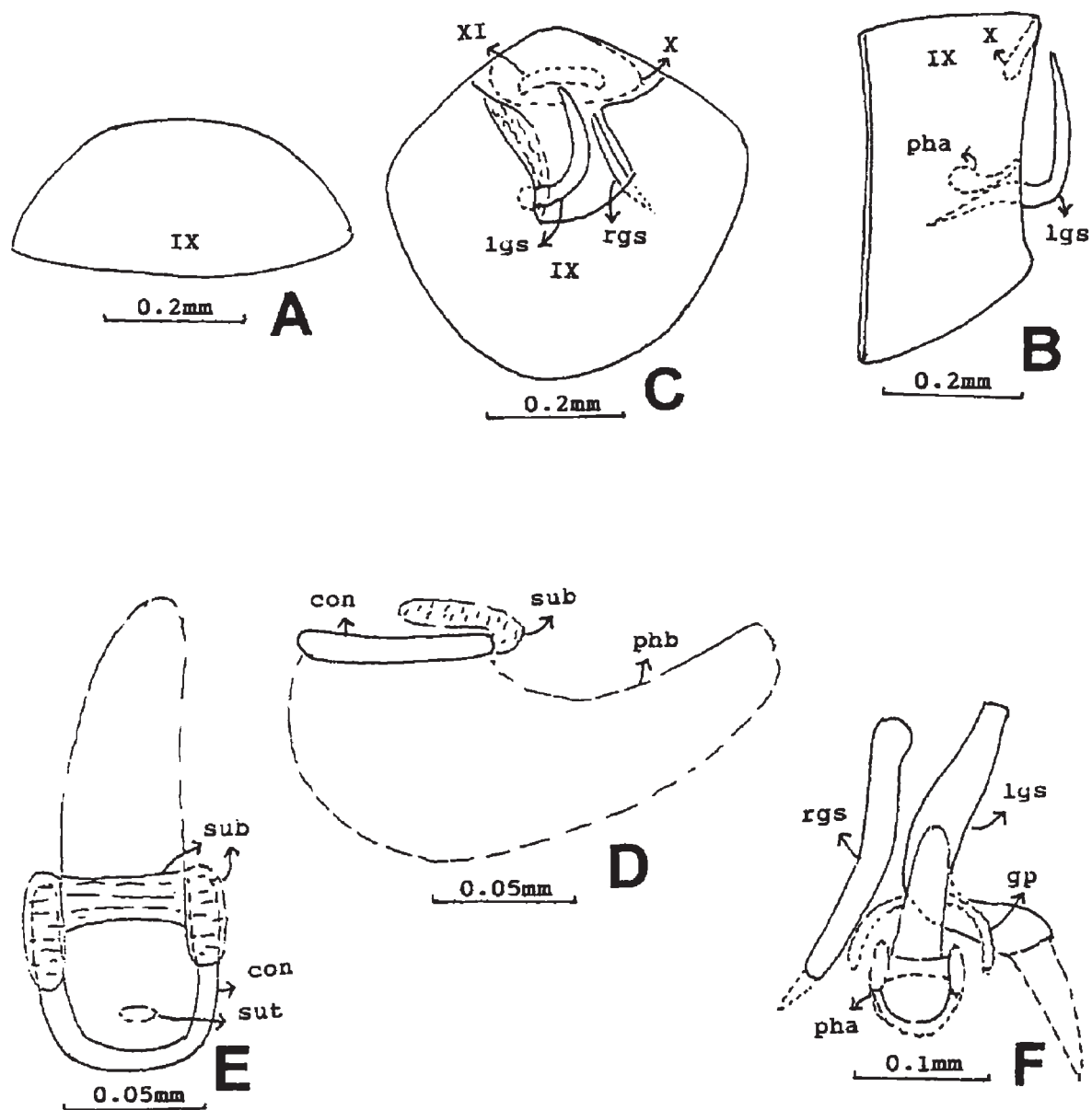


Fig. 71. *Monalocoris nigrus*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, lateral view; C. the same, caudal view; D. phallus, lateral view; E. the same, dorsal view; F. phallus and genital styles, dorsal view.

VII. Subfamily Deraeocorinae**(16) Tribe Deraeocorini**

72. *Dortus primarius* Distant, 1910

Fig. 72

Apex of abdominal tergite IX 0.41 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, right 1/2 roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI not retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge well developed. Capitae processes moderately large. Support tube somewhat upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part lightly pigmented, not spiraled; apical part slender, spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, dorsal one rod-like, long. Exposed phallobasal conjunctiva bulbous. Aedeagus shortened, apical 1/2 widened. Gonopore undefined, with sclerotized ridges.

Specimen examined: 1 male. Taiwan: Nantou Co., Lienhuachih. Watershed No. 3. 11~19 June 2001. C. S. Lin and W. T. Yang, malaise trap. Det. by C. S. Lin.

73. *Fingulus collaris* Miyamoto, 1965

Fig. 73

Apex of abdominal tergite IX 0.42 times width of widest portion; apical margin shallowly emarginated. Sternite with seemingly asymmetrical apex. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge well developed. Capitae processes rather large. Support tube somewhat [?]upper. Expanded ejaculatory duct separated into 2 parts; basal part rod-like, not spiraled; apical part slender, spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, dorsal one nearly tube-shaped. Exposed phallobasal conjunctiva bulbous, apex 3-branched. Aedeagus shortened,

small. Gonopore undefined, with sclerotized ridges.

Specimen examined: 1 male. Taiwan: Nantou Co., Sungkang. Oct. 1984. K. S. Lin and K. C. Chou, malaise trap. Det. by C. S. Lin.

74. *Stethoconus praefectus* (Distant, 1909)

Fig. 74

Apex of abdominal tergite 0.47 times width of widest portion; apical margin deeply emarginated. Sternite with slightly asymmetrical apex. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, V-shaped. Support bridge poorly developed, very narrow in lateral view. Capitae processes rather large. Support tube somewhat upraised. Expanded ejaculatory duct not separated into 2 parts, L-shaped, anterior margin heavily pigmented, not spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, dorsal one large, width at base more than 1/2 width of phallobase. Exposed phallobasal conjunctiva bulbous, apex 3-branched. Aedeagus shortened, subparallel-sided. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Taichung Co., Wanfeng. Sept. 1984. K. S. Lin and C. K. Chou, malaise trap. Det. by C. S. Lin.

75. *Araspus* sp.

Fig. 75

Apex of abdominal tergite IX 0.45 times width of widest portion; apical margin deeply emarginated. Sternite with asymmetrical apex. Abdominal segment X transverse, directed to right and laterocaudad. Abdominal segment XI retracted into segment X, rather to the left. Genital plates arched, uniformly wide. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes moderately large. Support tube somewhat upraised. Support ring subquadrate. Expanded ejaculatory duct separated into 2 parts; basal part converging to apex, lightly pigmented, not spiraled; apical part slender, spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in

genital chamber, base of dorsal one about 1/2 width of phallobase. Exposed phallobasal conjunctiva bulbous. Aedeagus shortened, slightly widened near apex. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Nantou Co., Lienhuachih. 12 Sept. 2002. C. S. Lin NMNS ENT 3940-960. Det. by C. S. Lin.

76. *Deraeocoris* sp.

Fig. 76

Apex of abdominal tergite IX 0.42 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex. Right 1/2 roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed, triangular in lateral view. Capitae processes large. Support tube not upraised. Support ring elongate ovate. Expanded ejaculatory duct separated into 2 parts; basal part converging to apex, anterior margin heavily pigmented, not spiraled; apical part slender, spiraled. Sheath differentiated. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, base of dorsal one about 1/2 width of phallobase. Exposed phallobasal conjunctiva bulbous, with pigmented portion at apex. Aedeagus shortened. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Nantou Co., Huisun. 20 Feb. 1990. C. S. Tseng. Det. by C. S. Lin.

77. *Deraeocoris apicatus* Kerzhner and Schuh, 1995

Fig. 77

Apex of abdominal tergite IX 0.52 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, right 2/3 roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Both ends of genital plates expanded. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes

moderately large. Support tube not upraised. Support ring ovate in dorsal view. Expanded ejaculatory duct separated into 2 parts; basal part rounded, not spiraled; apical part slender, obscurely spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, dorsal one less than 1/2 width of phallobase. Exposed phallobasal conjunctiva bulbous, branched at apex. Aedeagus shortened. Gonopore undefined, with sclerotized ridges.

Specimen examined: 1 male. Taiwan: Nantou Co., 31 Jan. 1989. K. W. Huang. Det. by C. S. Lin.

78. *Dortus chinai* Miyamoto, 1965

Fig. 78

Apex of abdominal tergite IX 0.50 times width of widest portion; apical margin shallowly emarginated. Sternite with symmetrical apex, broad, roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes rather small. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part rod-like, not spiraled; apical part slender, spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, base of dorsal one less than 1/2 width of phallobase. Exposed phallobasal conjunctiva slender, with 2 long, pigmented processes within cavity. Aedeagus shortened, apex slightly widened. Gonopore undefined, with sclerotized ridges.

Specimen examined: 1 male. Taiwan: Taichung Co., Kukuan. 10 July 1984. C. S. Lin. Det. by C. S. Lin.

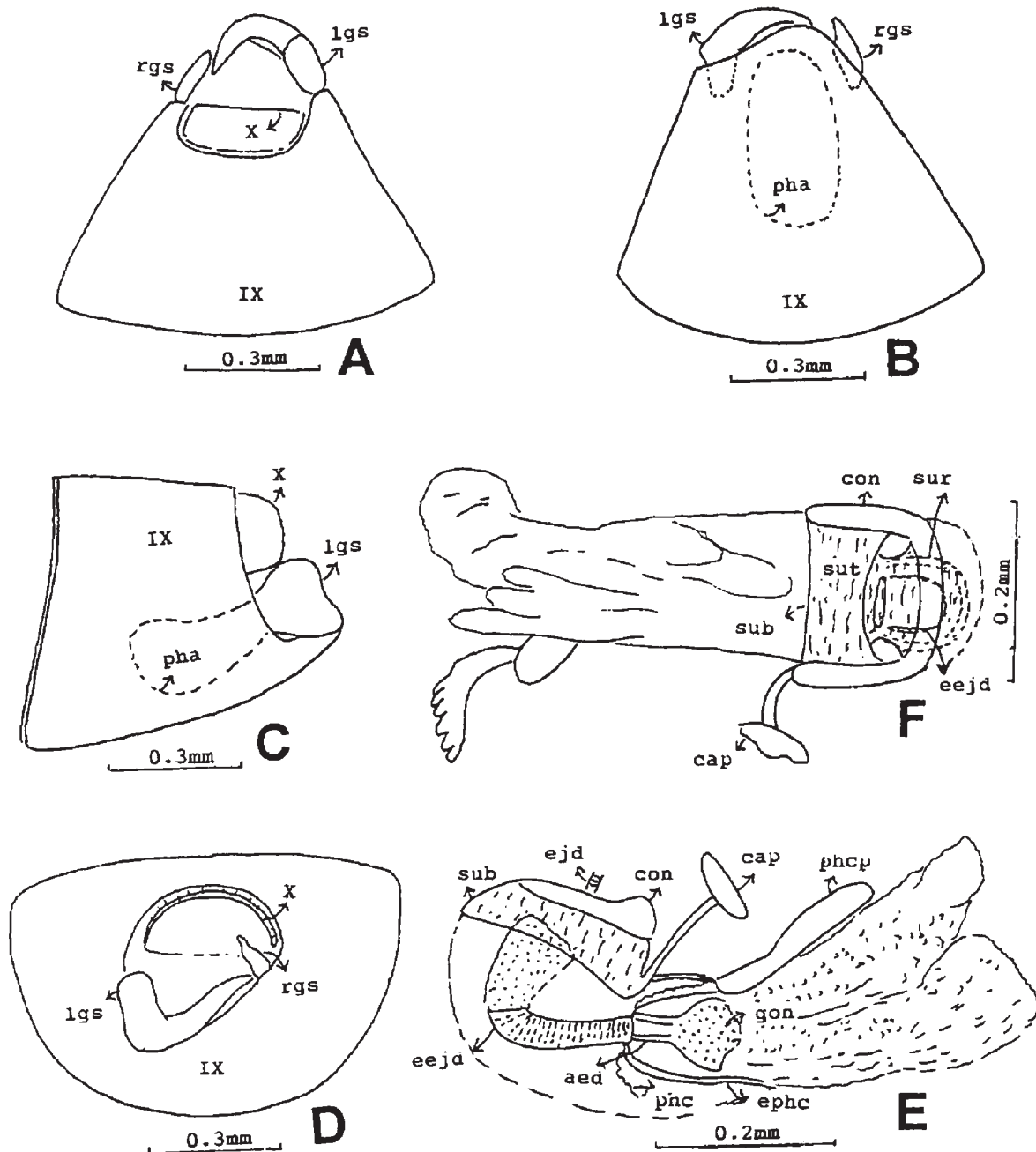


Fig. 72. *Dortus primarius*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view.

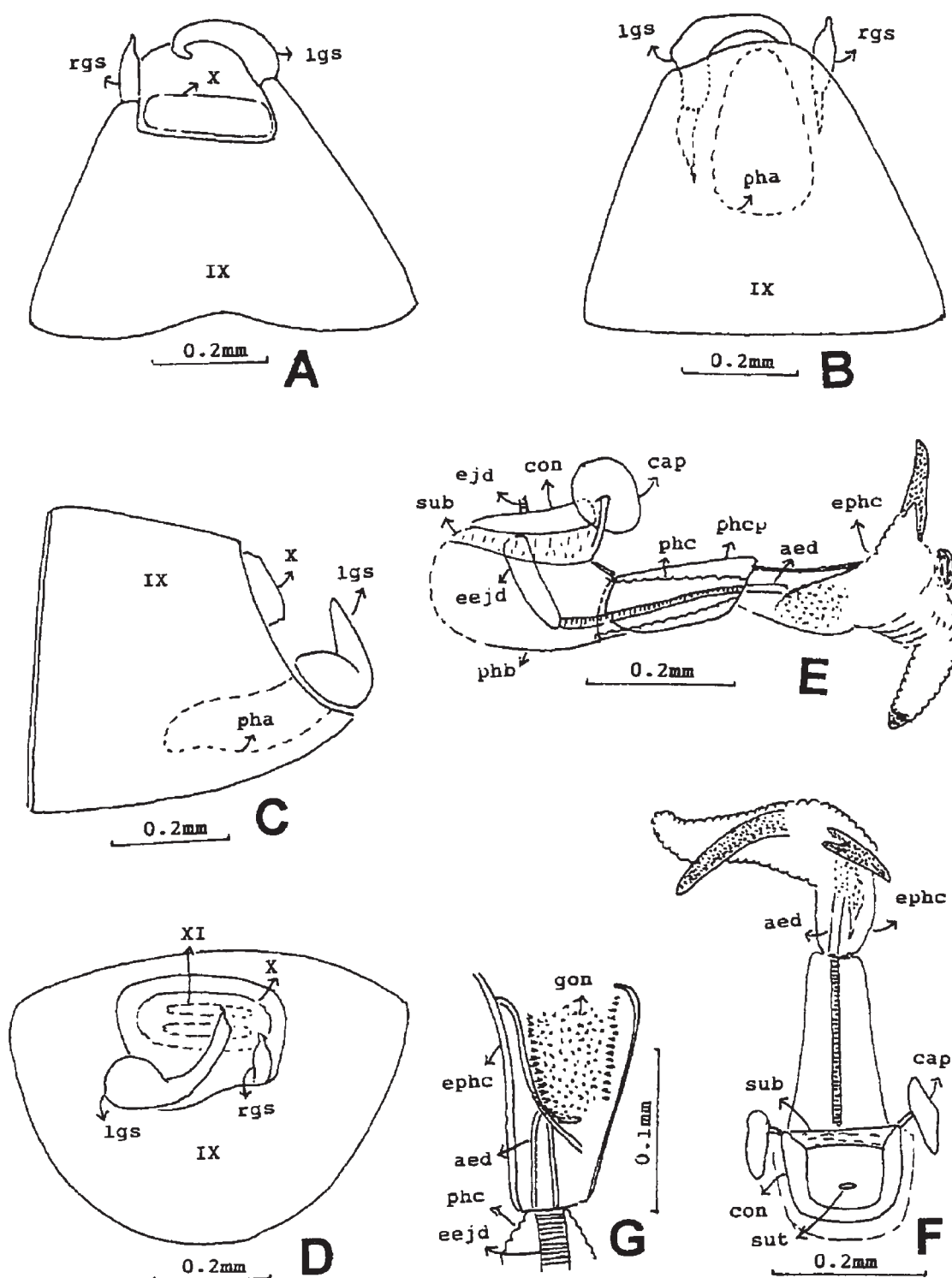


Fig. 73. *Fingulus collaris*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. aedeagus, dorsal view.

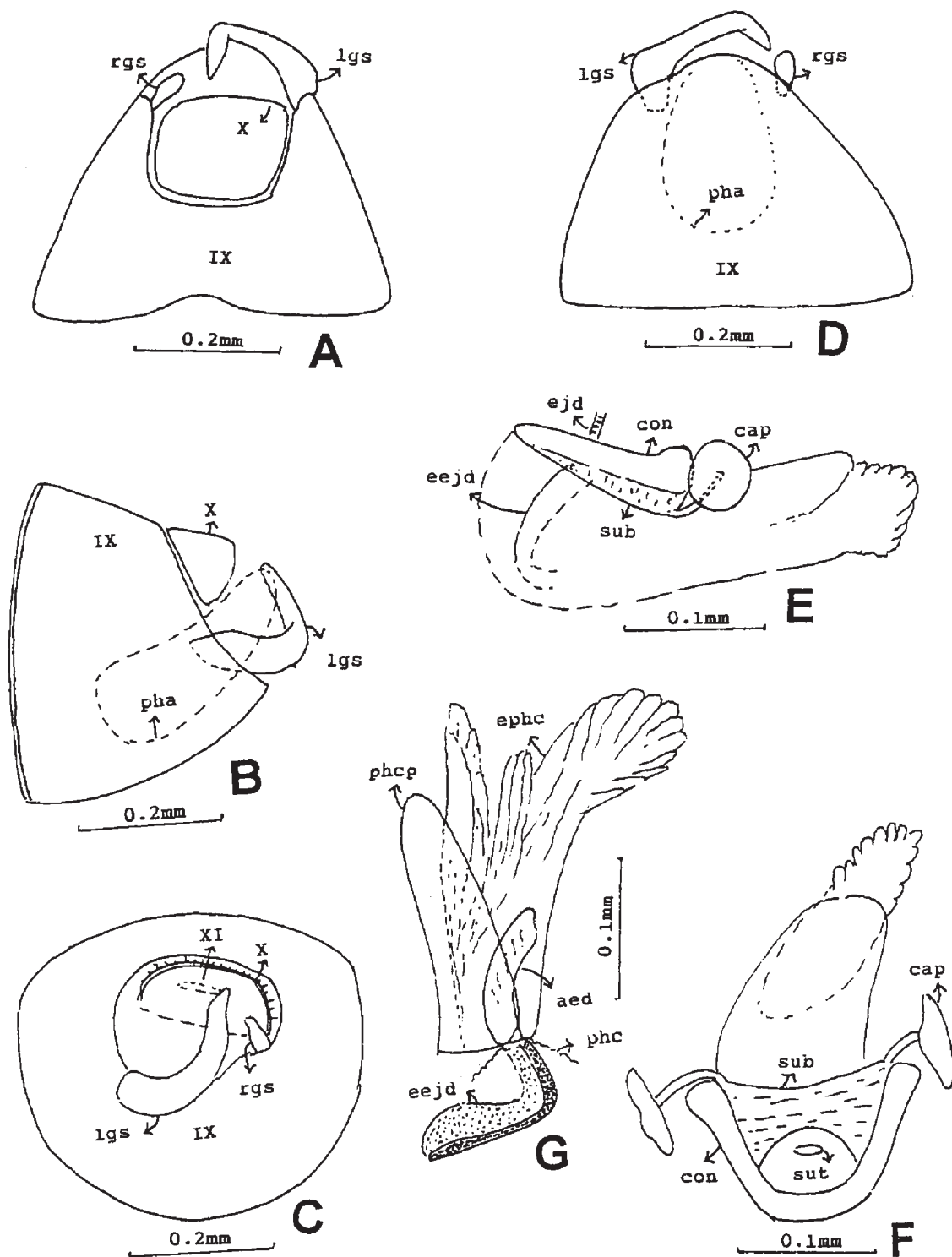


Fig. 74. *Stethoconus praefectus*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, lateral view; C. the same, caudal view; D. the same, ventral view; E. phallus, lateral view; F. the same, dorsal view; G. aedeagus, lateral view.

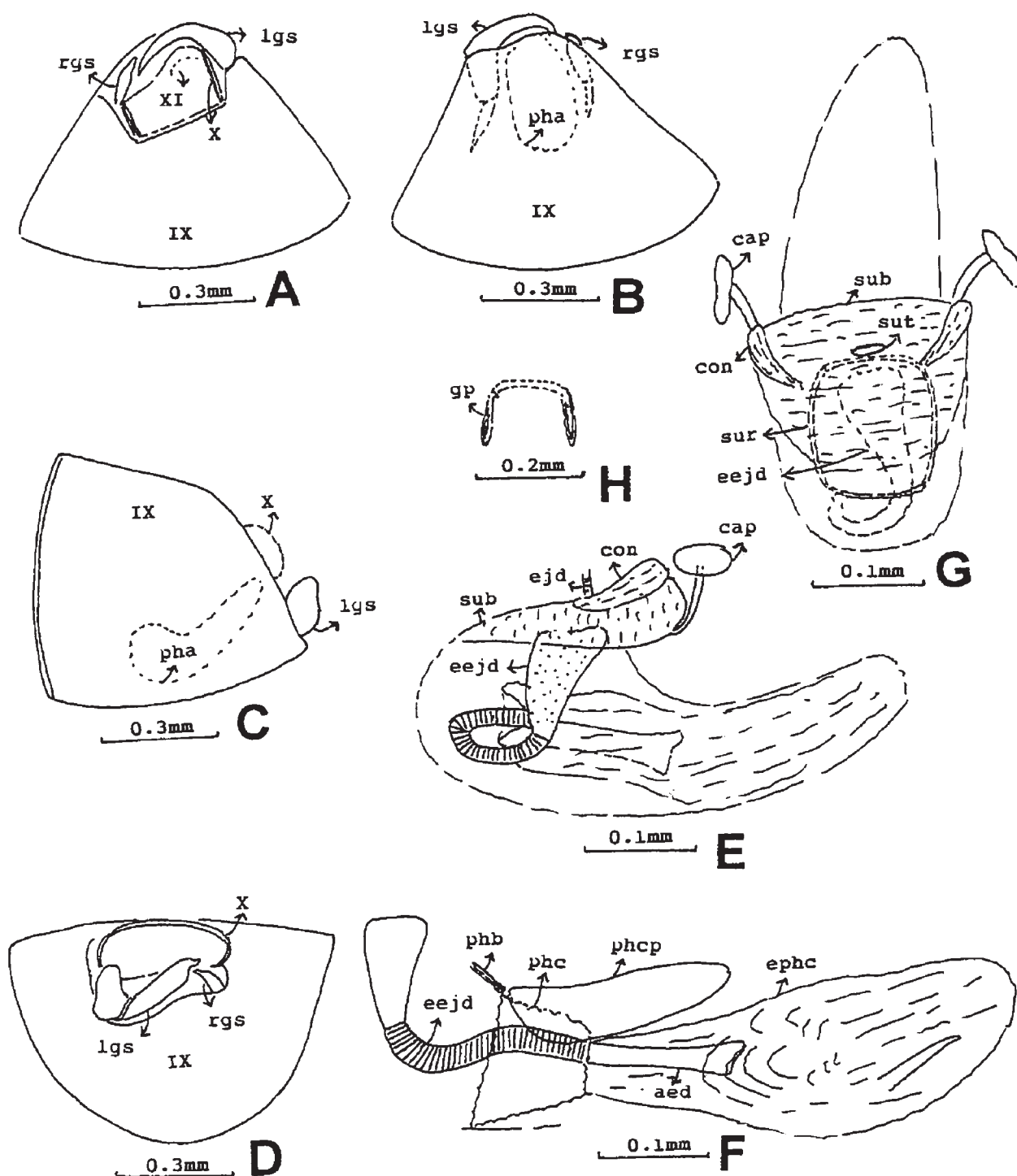


Fig. 75. *Araspus* sp. A. Abdominal segments IX and XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. aedeagus, lateral view; G. phallus, dorsal view; H. genital plates, dorsal view.

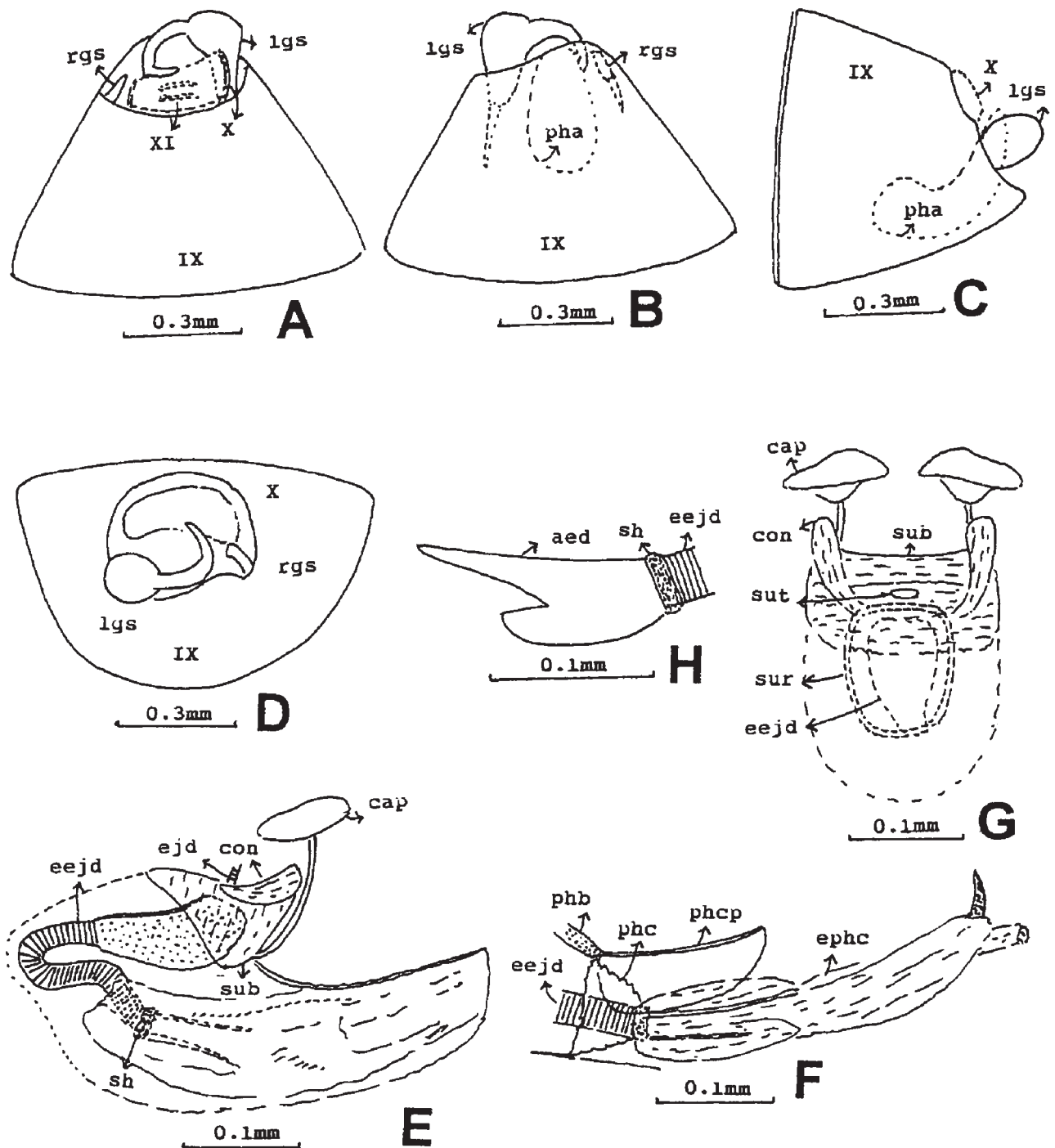


Fig. 76. *Deraeocoris* sp. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. aedeagus in complete eversion, lateral view; G. phallus, dorsal view; H. aedeagus, lateral view.

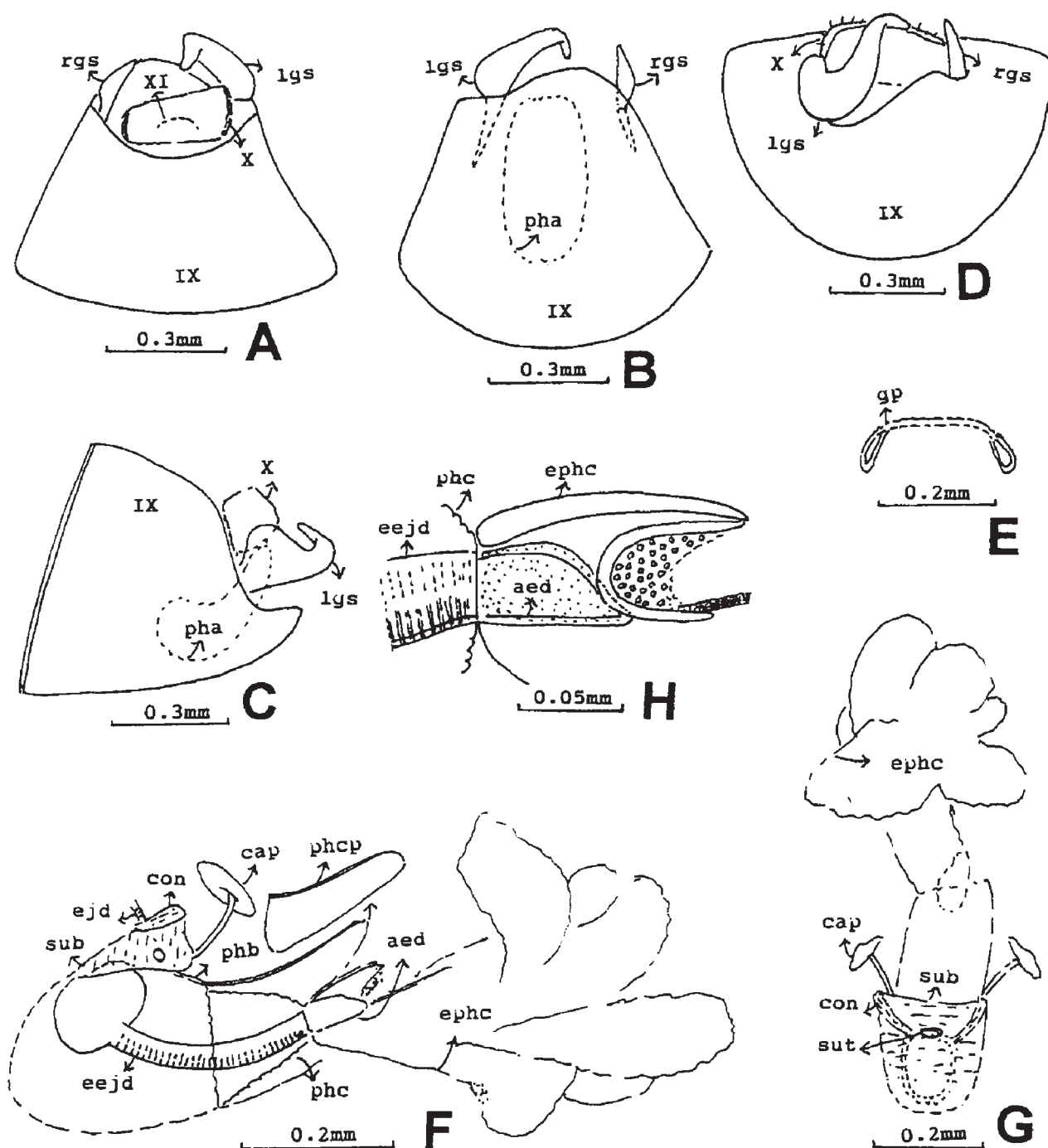


Fig. 77. *Deraeocoris apicatus*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. genital plates, dorsal view; F. phallus in complete eversion, lateral view; G. the same, dorsal view; H. aedeagus, lateral view.

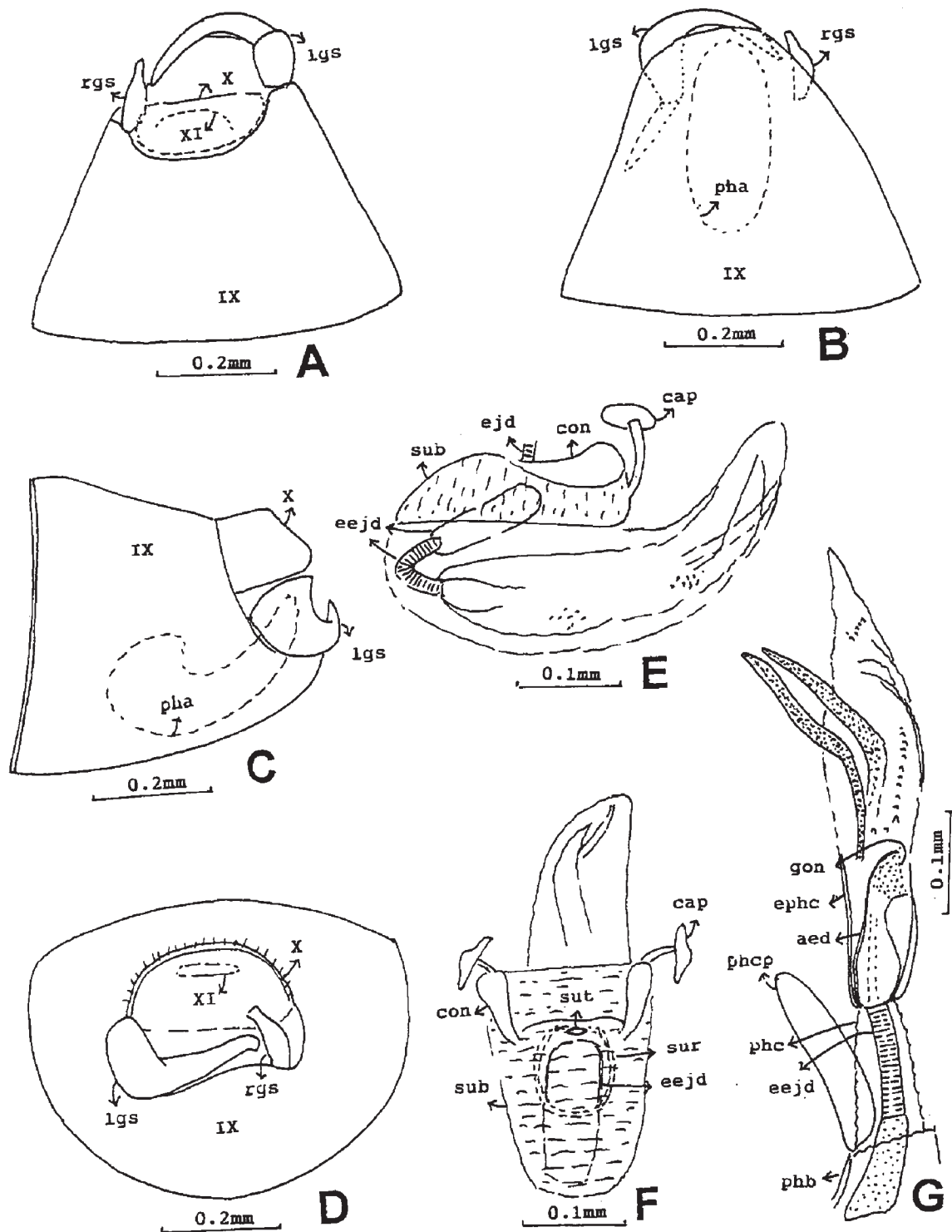


Fig. 78. *Dortus chinai*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. aedeagus in complete eversion, lateral view.

(17) Tribe Termatophylini

79. *Termatophylum orientale* Poppius, 1915

Fig. 79

Abdominal segment IX rotated clockwise 180°; extension differentiated. Apex of abdominal tergite IX 0.59 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, left 4/5 roundly produced caudad. Abdominal segment X transverse, morphologically directed to right and laterocaudad. Abdominal segment XI not examined. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge poorly developed, rather large in lateral view but not extending over bottom of connective. Capitae processes moderately large. Support tube not [?]upper. Expanded ejaculatory duct separated into 2 parts; basal part elongate quadrate, lightly pigmented, not spiraled; apical part slender, spiraled. Both phallobase and phallobasal conjunctiva judged to be shortened because phallobasal conjunctival processes exposed in genital chamber differentiated, base of dorsal one about 1/2 width of phallobase. Exposed phallobasal conjunctiva judged to be differentiated. Aedeagus shortened, membranous. Gonopore difficult to recognize.

Specimen examined: 1 male. Taiwan: Nantou Co., Tungpu. Oct. 1985. K. S. Lin, Malaise trap. Det. by C. S. Lin.

Remarks on Description of the Deraeocorinae

Abdominal segment IX with completely fused tergite and sternite; dorsoventral not elongate quadrate in lateral view; its posterior opening not directed ventrocaudad; its anterior margin with undifferentiated extension; its surface without a process. Abdominal segment X transverse; directed either caudad or to right and laterocaudad; situated after abdominal tergite IX. Genital styles asymmetrical in shape and size, one on left larger.

Connective either complete or with transverse portion reduced. Support bridge either poorly or well developed, not winged. Capitae processes differentiated. Expanded ejaculatory duct either separated into 2 parts; basal part variable in form, not spiraled; apical part spiraled; or not separated into 2 parts, not spiraled. Sheath either

undifferentiated or differentiated. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber differentiated. Exposed phallobasal conjunctiva differentiated. Aedeagus shortened. Gonopore either difficult to recognize or undefined, with sclerotized ridges.

VIII. Subfamily Mirinae**(18) Tribe Mirini**

80. *Allorhinocoris chinensis* Lu et Zheng, 1994

Fig. 80

Apex of abdominal tergite IX 0.54 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, left laterocaudal margin concave. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger, characteristic as figured.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes comparatively large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part stout, widened near middle, lightly pigmented, not spiraled; apical part rather broad, obscurely spiraled. Sheath triangular. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, dorsal one rather small, its base about 1/4 width of phallobase. Exposed phallobasal conjunctiva bulbous. Aedeagus shortened, stiff, cylindrical. Gonopore defined, with transverse ridges, ovate, directed dorsad.

Specimen examined: 1 male (paratype). China: Gansu Prov., Uzhong. 3 July 1992.

81. *Castanopsides hasegawai* Yasunaga, 1992

Fig. 81

Apex of abdominal tergite IX 0.42 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, left 3/4 roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plate arched, uniformly wide. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes

moderately large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part converging to apex, anterior margin heavily pigmented, not spiraled; apical part obscurely spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, base of dorsal one about 1/3 width of phallobase. Exposed phallobasal conjunctiva bulbous, apical 1/2 2-lobed, lower lobe with a long, pigmented process. Aedeagus shortened, subparallel-sided. Gonopore defined, with transverse ridges, subquadrate, directed to left.

Specimen examined: 1 male. Taiwan: Taichung Co., Chaipaotai. 8~10 May 1986. C. S. Lin. Det. by C. S. Lin.

82. *Creontiades coloripes* Hsiao et Meng, 1963
Fig. 82

Apex of abdominal tergite IX 0.42 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, right 5/6 roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI not examined. Genital plates arched, uniformly wide. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes comparatively large. Both phallobase and phallobasal conjunctiva shortened. Expanded ejaculatory duct separated into 2 parts; basal part widely expanded near middle, lightly pigmented, not spiraled; apical part spiraled. Phallobasal conjunctival processes exposed in genital chamber, base of dorsal one about 1/4 width of phallobase. Exposed phallobasal conjunctiva bulbous. Aedeagus shortened, subparallel-sided. Gonopore defined, with transverse ridges, ovate, directed to left.

Specimen examined: 1 male. Taiwan: Nantou Co., Huisun. 20 Feb. 1990. C. S. Tzeng, light trap. NMNS ENT 629-7068. Det. by C. S. Lin.

83. *Apolygus concinnus* (Wang et Zheng, 1982)
Fig. 83

Apex of abdominal tergite IX 0.46 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, acutely produced caudad. Abdominal segment X

transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes small. Support tube not [?]upper. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part subquadrate, lightly pigmented, not spiraled; apical part spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, base of dorsal one about 1/5 width of phallobase. Exposed phallobasal conjunctiva bulbous. Aedeagus shortened, slender, ventral margin near middle roundly produced ventrad in lateral view. Gonopore defined, with transverse ridges, ovate, directed to left.

Specimen examined: 1 male (paratype). China: Fujian Prov., Chongan. 23 June 1965. Liang Chen Wang.

84. *Lygus bengalicus* Reuter, 1884
Fig. 84

Apex of abdominal tergite IX 0.45 times width of widest portion; apical margin shallowly emarginated. Sternite with slightly asymmetrical apex, acutely produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates arched, both ends expanded. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes comparatively large. Support tube somewhat upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part converging to apex, lightly pigmented, not spiraled; apical part spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, base of dorsal one about 1/3 width of phallobase. Exposed phallobasal conjunctiva bulbous, 2-lobed, with 1 pigmented process. Aedeagus shortened, basal 1/2 subparallel-sided, apical 1/2 widened. Gonopore defined, with transverse ridges, ovate, directed to left and dorsolaterad.

Specimen examined: 1 male. China: Yunnan Prov., 26 Oct. 2000. Wen-jun Bu.

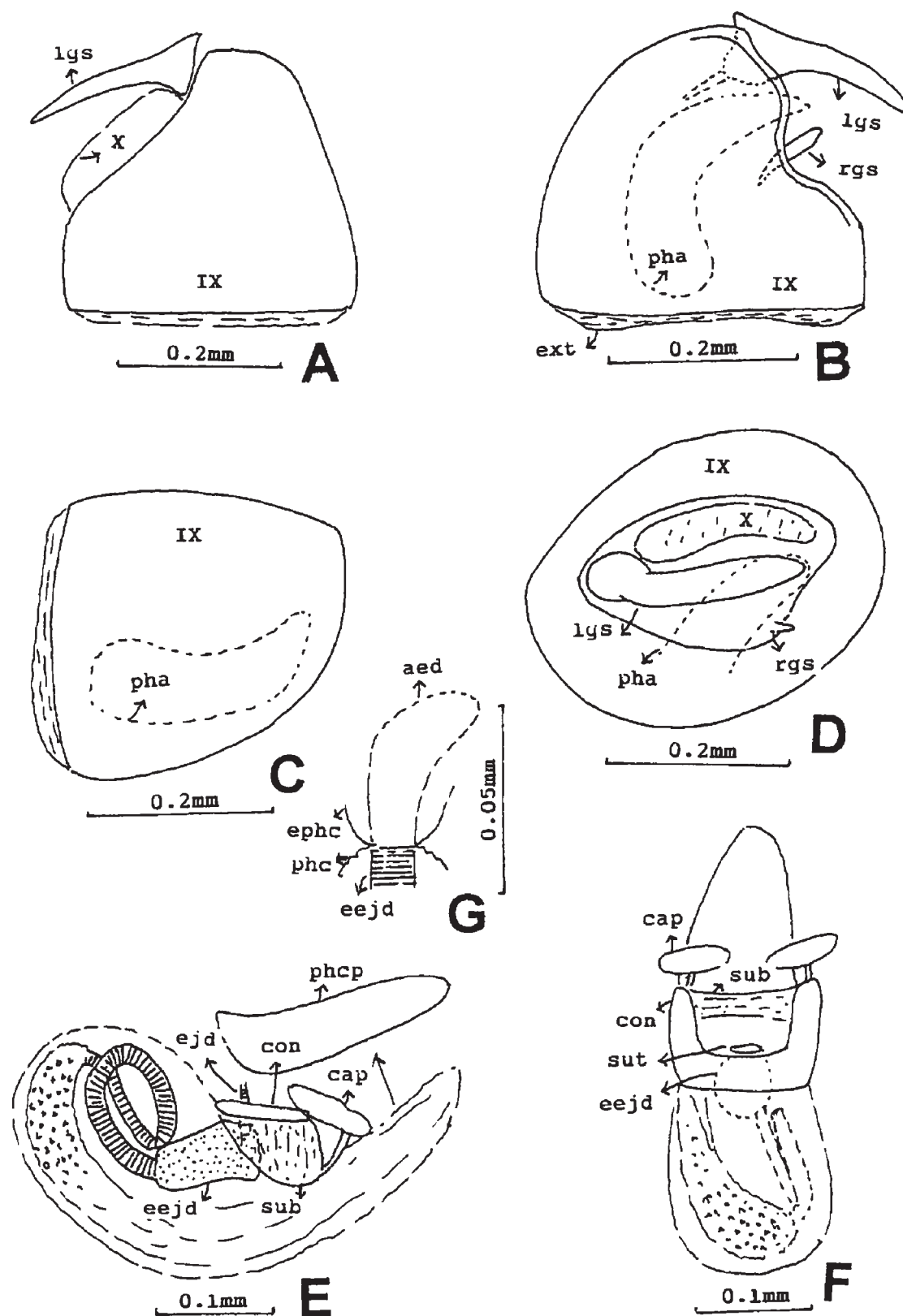


Fig. 79. *Teratophylum orientale*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. aedeagus, lateral view.

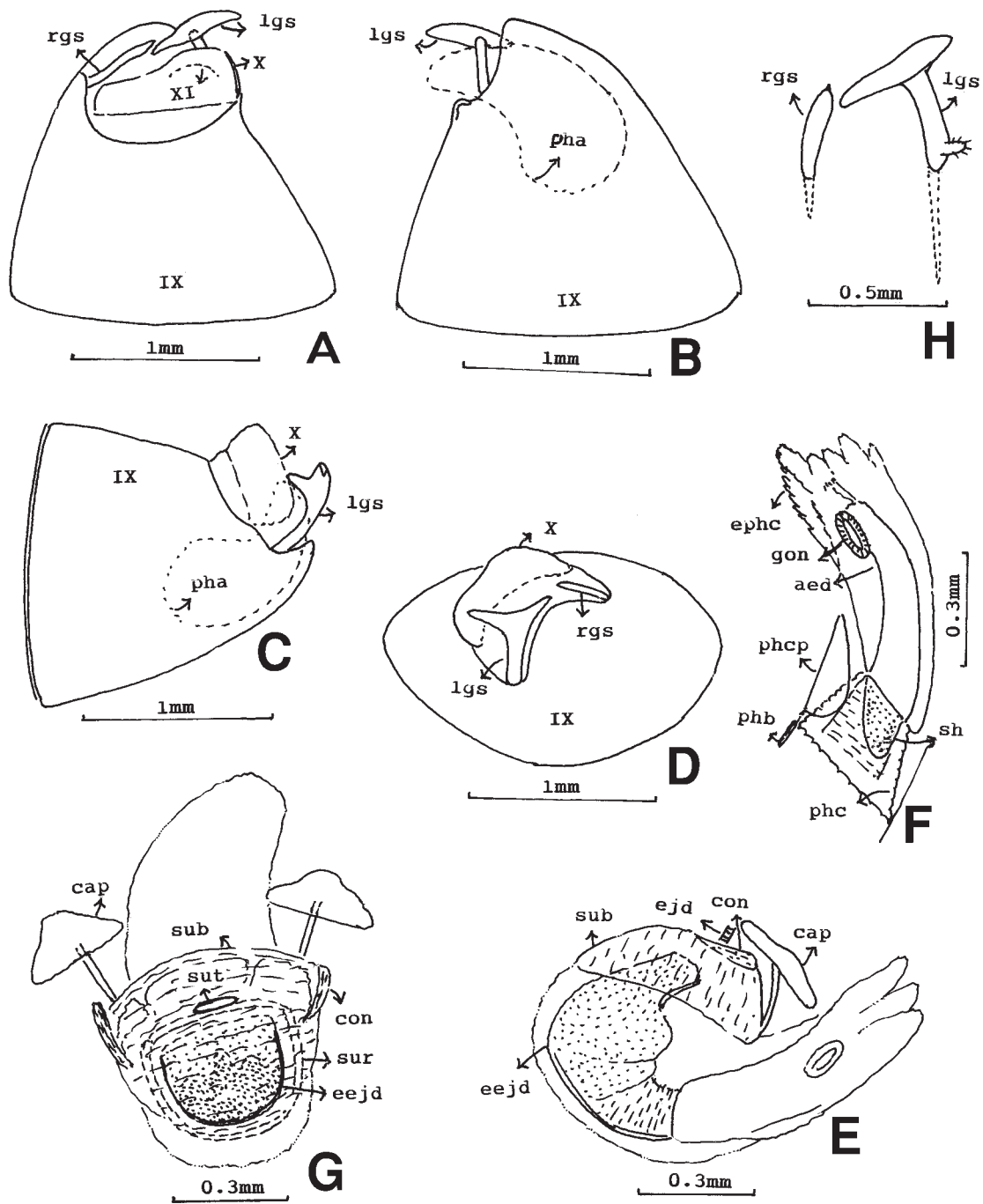


Fig. 80. *Allorhinocoris chinensis*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. aedeagus in complete eversion, lateral view; H. right and left genital styles.

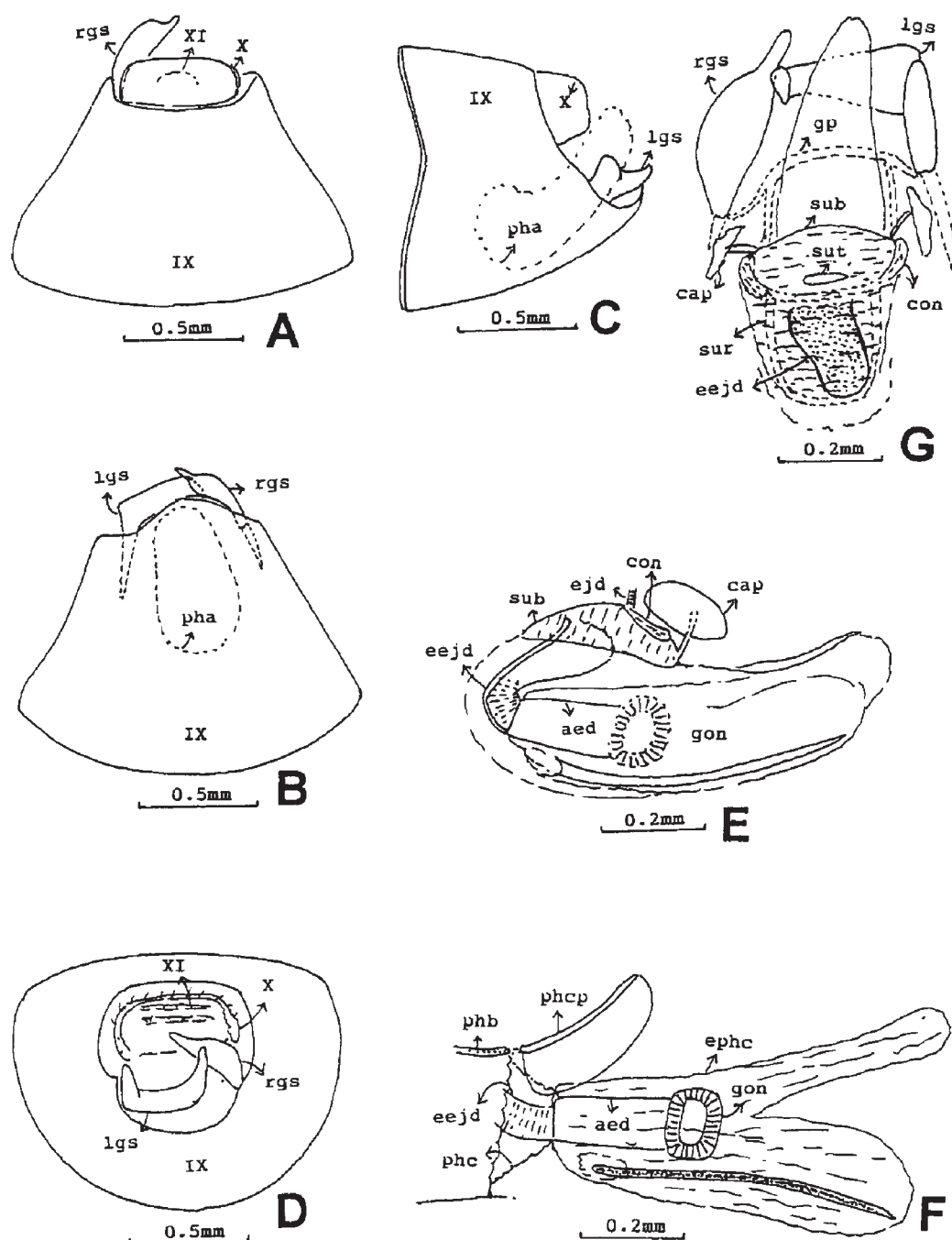


Fig. 81. *Castanopsides hasegawai*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. aedeagus in complete eversion, lateral view; G. phallus, dorsal view.

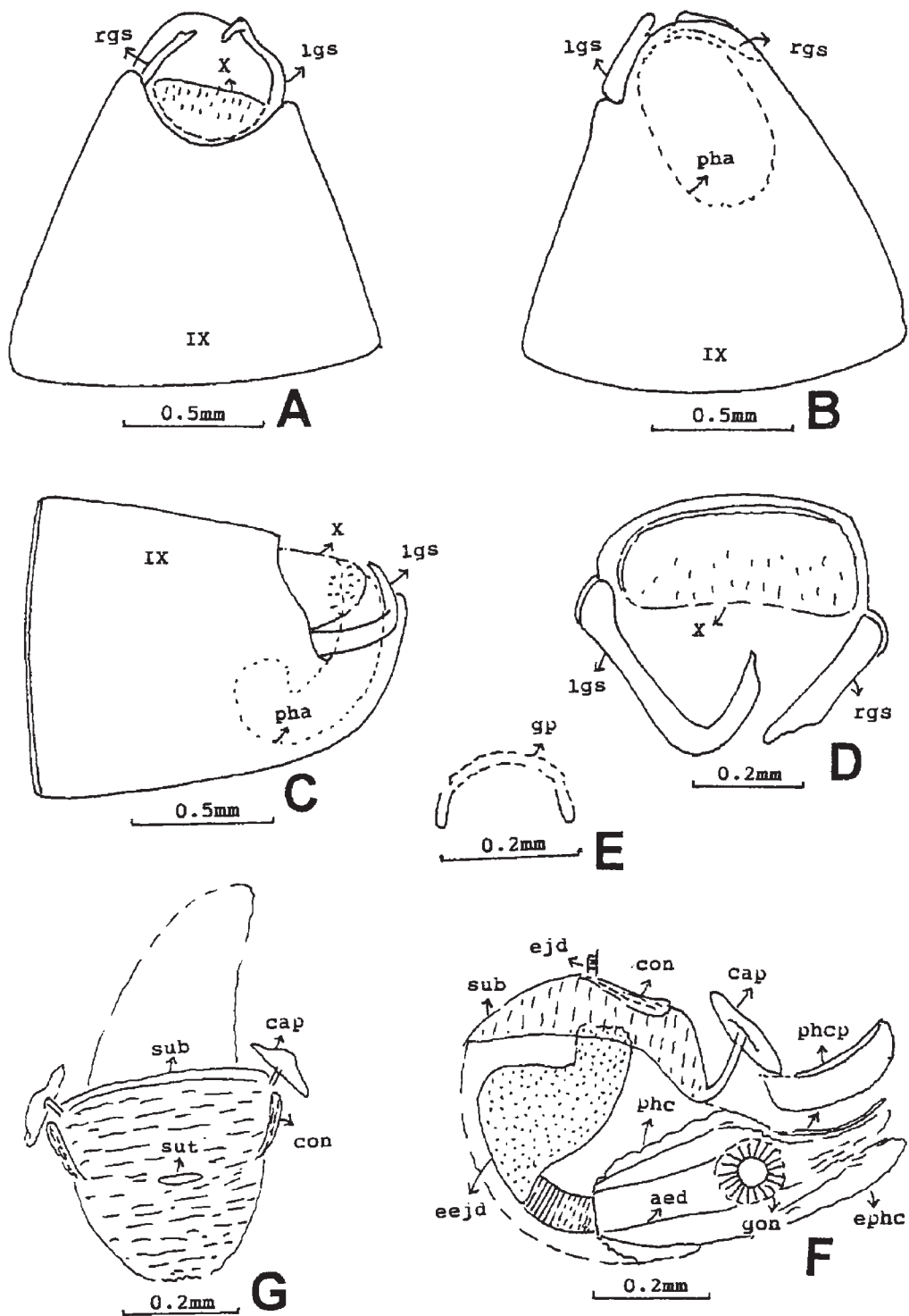


Fig. 82. *Creontiades coloripes*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. abdominal segment X and genital styles, caudal view; E. genital plates, dorsal view; F. phallus, lateral view; G. the same, dorsal view.

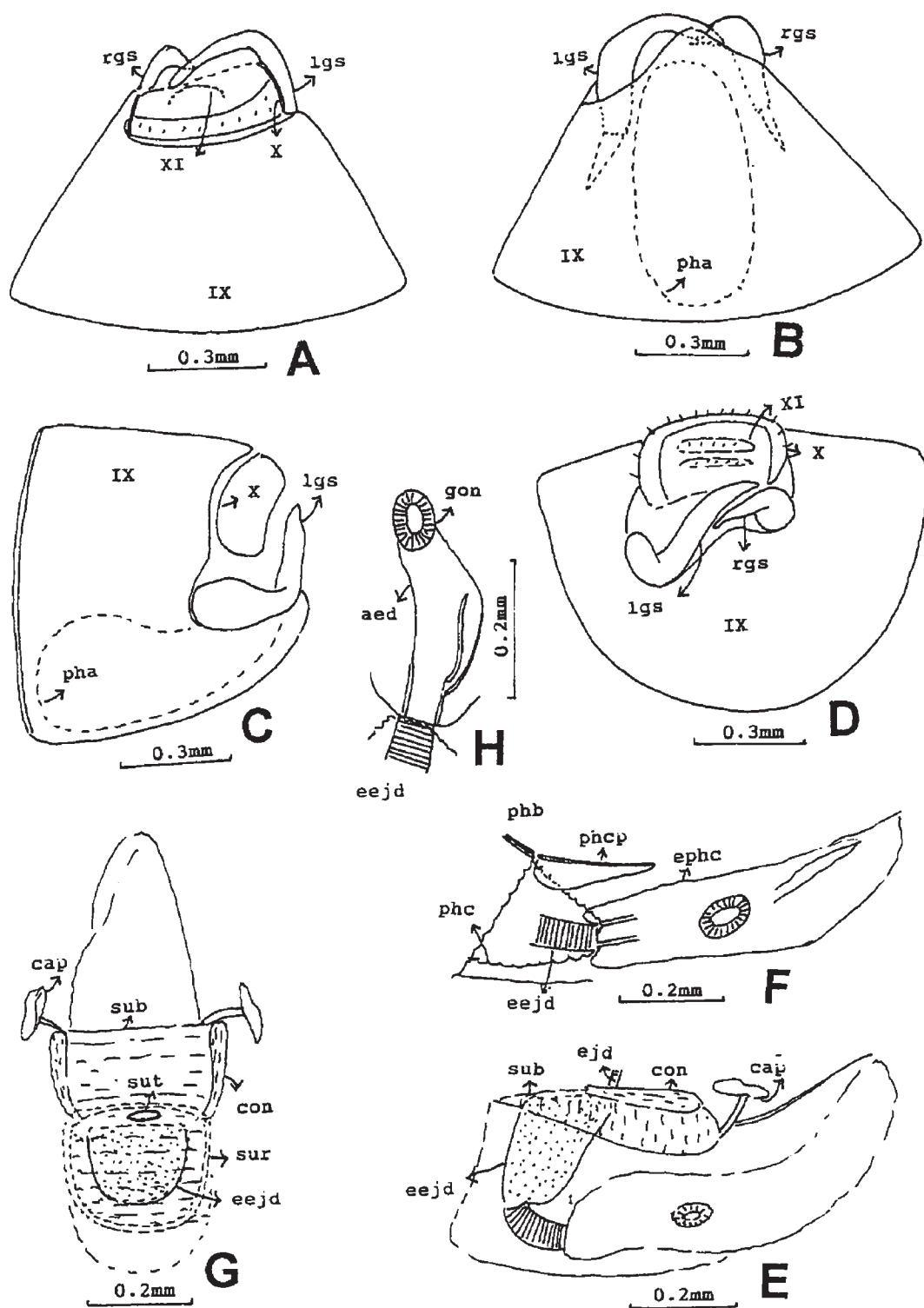


Fig. 83. *Apolygus concinnus*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. exposed phallobasal conjunctiva in complete eversion, lateral view; G. phallus, dorsal view; H. aedeagus, lateral view.

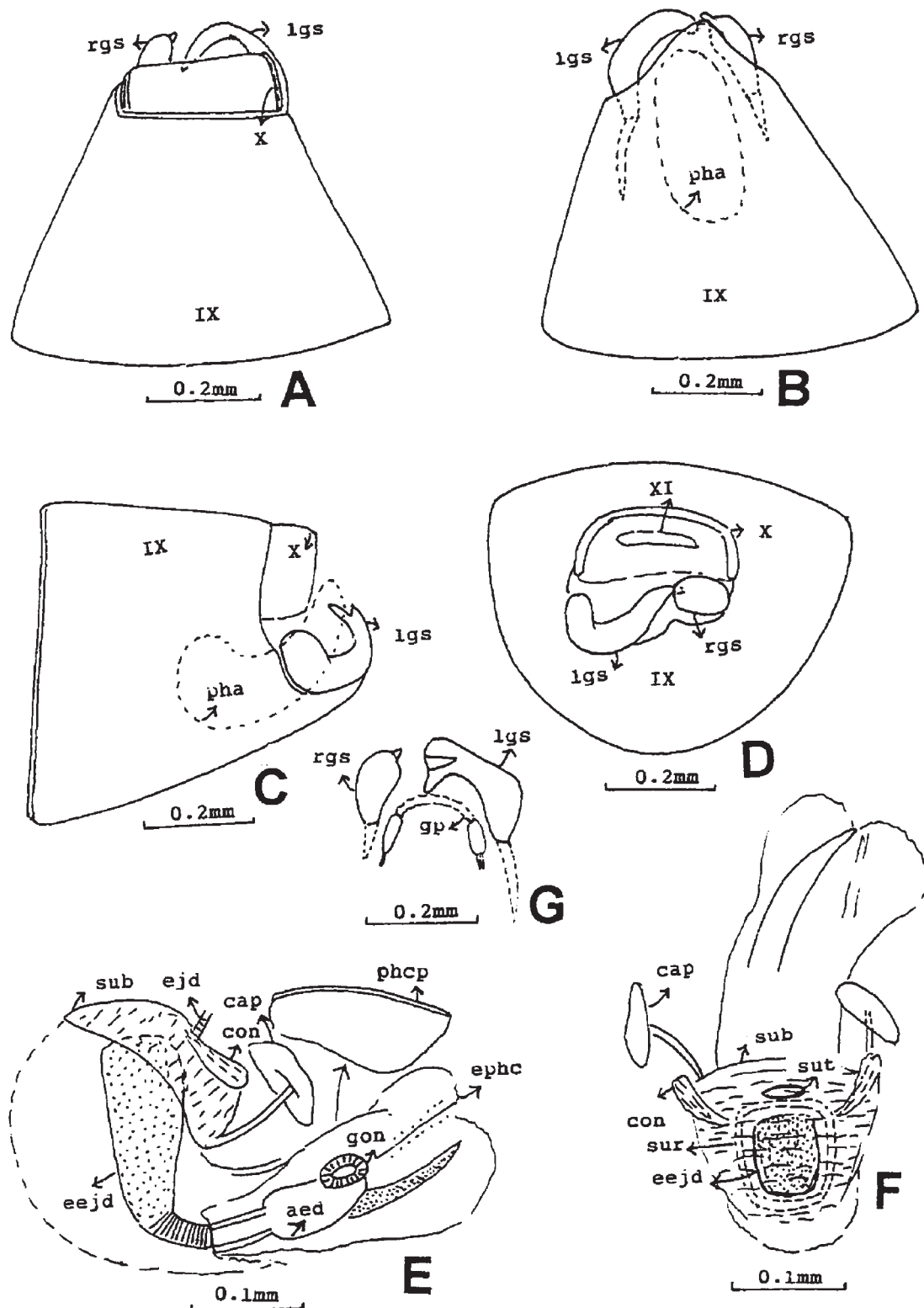


Fig. 84. *Lygus bengalicus*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. genital plates and genital styles, dorsal view.

85. *Taylorilygus apicalis* (Fieber, 1861)

Fig. 85

Apex of abdominal tergite IX 0.51 times width of widest portion; apical margin almost entirely not emarginated. Sternite with asymmetrical apex, right 2/3 roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates arched, uniformly wide. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed, both dorsolateral portions winged, directed cephalad. Capitate processes comparatively large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part elongate subquadrate, heavily pigmented, not spiraled; apical part obscurely spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, dorsal one small, rod-like. Exposed phallobasal conjunctiva bulbous. Aedeagus shortened, parallel-sided. Gonopore defined, with transverse ridges, ovate, directed to left.

Specimen examined: 1 male. Taiwan: Taitung Co., Kuanshan. 10 Aug. 1989. K. W. Huang. NMNS ENT 498-139. Det. by C. S. Lin.

86. *Phytocoris* sp.

Fig. 86

Left apical angle of abdominal segment IX with a pigmented obtuse process. Apex of abdominal tergite IX 0.56 times width of widest portion; apical margin shallowly emarginated. Sternite with symmetrical apex, acutely produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left slight larger.

Connective with reduced transverse portion. Support bridge well developed. Capitate processes comparatively large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part rod-like, lightly pigmented, not spiraled; apical part spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, base of dorsal one about 1/3 width of phallobase. Exposed phallobasal

conjunctiva bulbous, 2-lobed, with a long, pigmented process. Aedeagus shortened, somewhat diverging to apex. Gonopore defined, with transverse ridges, ovate, directed to left.

Specimen examined: 1 male. Taiwan: Nantou Co., Wushe. 30 Nov. 1988. C. S. Lin. NMNS ENT 670-1993. Det. by C. S. Lin.

87. *Castanopsides falkovitshi* (Kerzhner, 1979)

Fig. 87

Apex of abdominal tergite IX 0.51 times width of widest portion; apical margin shallowly emarginated. Sternite with somewhat asymmetrical apex, right submedian portion acutely produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitate processes comparatively large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part converging to apex, heavily pigmented, not spiraled; apical part obscurely spiraled. Sheath very short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, base of dorsal one about 1/3 width of phallobase. Exposed phallobasal conjunctiva bulbous, 3-lobed, with 2 long, pigmented processes. Aedeagus shortened, median portion evenly widened. Gonopore defined, with transverse ridges, subquadrate, directed to left.

Specimen examined: 1 male. China: Sichuan Prov., Emeishan, Baogunshi (600 m), 12 Apr. 1957 Le-yi Zheng.

88. *Cheilocapsus nigrescens* Liu et Wang, 2001

Fig. 88

Apex of abdominal tergite IX 0.46 times width of widest portion; apical margin shallowly emarginated. Sternite with slightly asymmetrical apex, acutely produced caudad somewhat to left. Abdominal segment X transverse. Abdominal segment XI not examined. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitate processes extremely large. Support tube not upraised.

Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part elongate quadrate, lightly pigmented, not spiraled; apical part obscurely spiraled. Sheath short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, dorsal one rod-like. Exposed phallobasal conjunctiva bulbous, apex with 2 stout, pigmented processes. Aedeagus shortened, median portion curved downward in lateral view; apical 2/3 roundly expanded in dorsal view. Gonopore defined, with transverse ridges, directed to left and dorsolaterad.

Specimen examined: 1 male. China: Shaanxi. 7 Aug. 1994. L. V. Lu. Det. By L.Y. Zheng.

89. *Apolygus evonymi* (Zheng et Wang, 1983)
Fig. 89

Apex of abdominal tergite IX 0.38 times width of widest portion; apical margin shallowly emarginated. Sternite with slightly asymmetrical apex, acutely produced caudad somewhat to left. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in size, one on left slightly larger.

Connective with reduced transverse portion. Support bridge well developed. Capitate processes extremely large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part subquadrate, heavily pigmented, not spiraled; apical part spiraled. Sheath short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one about 1/4 of phallobase. Exposed phallobasal conjunctiva bulbous, apex with 2 pigmented processes. Aedeagus shortened, basal 1/4 narrow, apical 3/4 quadrate expanded. Gonopore defined, with transverse ridges, quadrate, directed to left.

Specimen examined: 1 male (paratype). 7 June 1957.

90. *Apolygus triangulus* (Zheng et Wang, 1983)
Fig. 90.

Apex of abdominal tergite IX 0.40 times width of widest portion; apical margin shallowly emarginated. Sternite with slightly asymmetrical apex, acutely produced caudad somewhat to right. Abdominal segment X transverse. Abdominal

segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in size, one on left slightly larger.

Connective with reduced transverse portion. Support bridge well developed, elongate oval in dorsal view, each dorsolateral portion near inner side of connective arm with an elongated hole. Capitate processes extremely large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part elongate quadrate, heavily pigmented, not spiraled; apical part spiraled. Sheath short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one about 1/4 of phallobase. Exposed phallobasal conjunctiva bulbous, apex with cuticular spots. Aedeagus shortened, basal narrow portion very short, the remainder quadrately expanded. Gonopore defined, with transverse ridges, quadrate, directed to left.

Specimen examined: 1 male (paratype). China: Hunan, Wuchang. 21 May 1965.

91. *Apolygus spinolae* (Meyer-Dur, 1841)
Fig. 91

Apex of abdominal tergite IX 0.42 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, acutely produced caudad somewhat to right. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitate processes extremely large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part subquadrate, lightly pigmented, not spiraled; apical part spiraled. Sheath short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one about 1/4 of phallobase. Exposed phallobasal conjunctiva bulbous, dorsocaudal portion with process. Aedeagus shortened, subquadrate expanded. Gonopore defined, with transverse ridges, quadrate, directed to left.

Specimen examined: 1 male. China: Beijing, Xi Mt. 24 Aug. 1957. T. H. En and S. F. Lee.

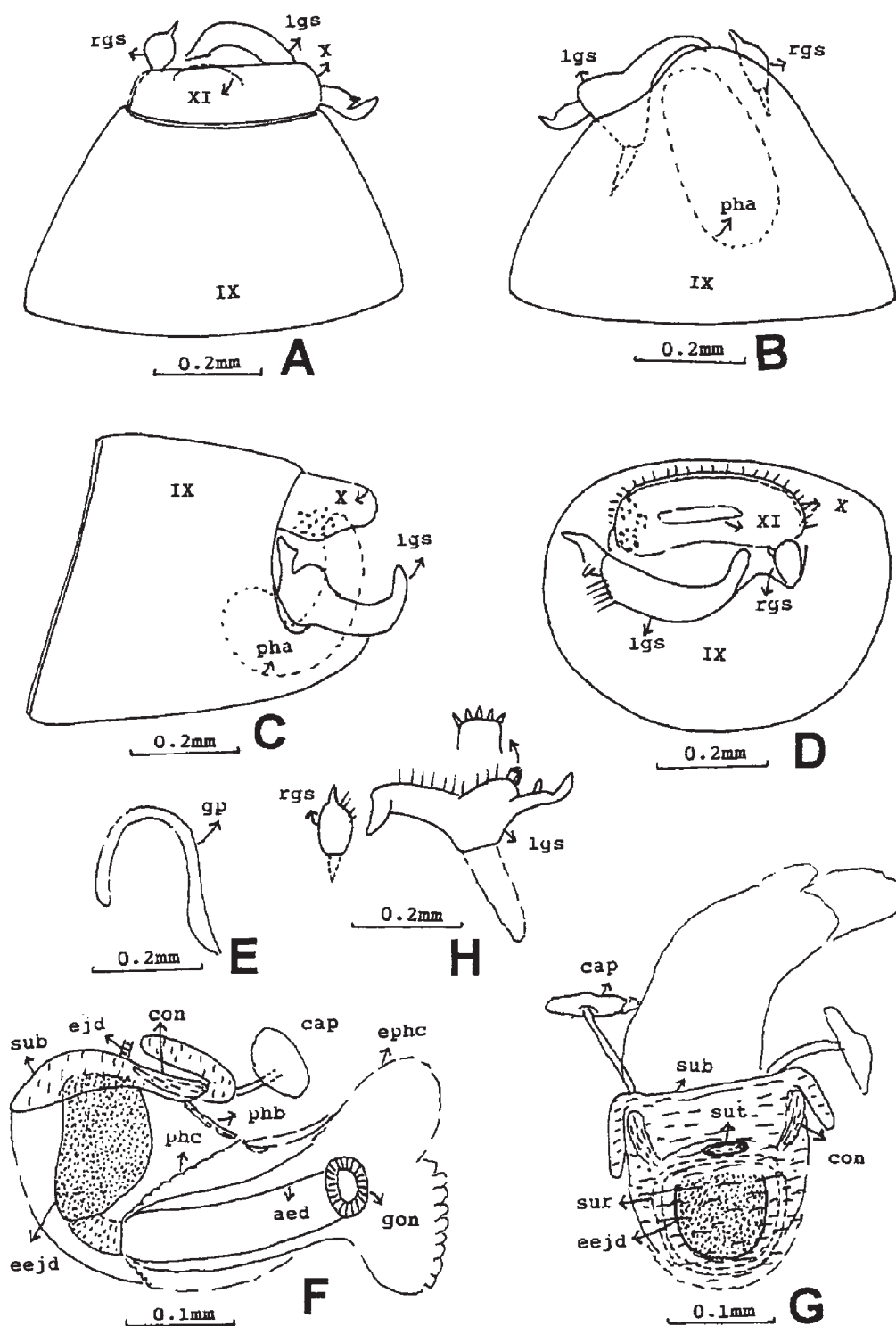


Fig. 85. *Taylorilygus apicalis*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. genital plates, dorsal view; F. phallus, lateral view; G. the same, dorsal view; H. genital styles, dorsal view.

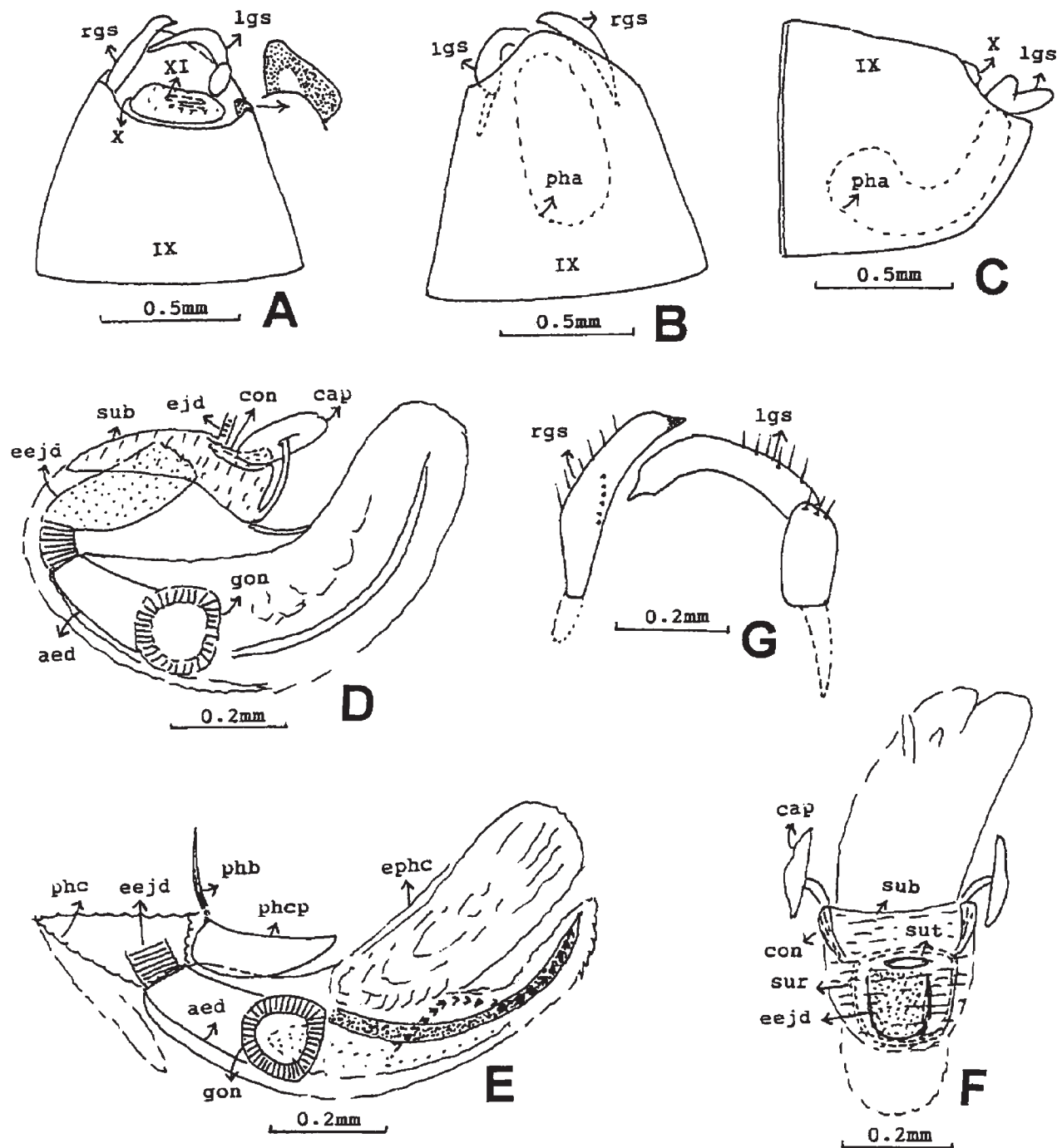


Fig. 86. *Phytocoris* sp. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. phallus, lateral view; E. aedeagus in whole eversion, lateral view; F. phallus, dorsal view; G. genital styles, dorsal view.

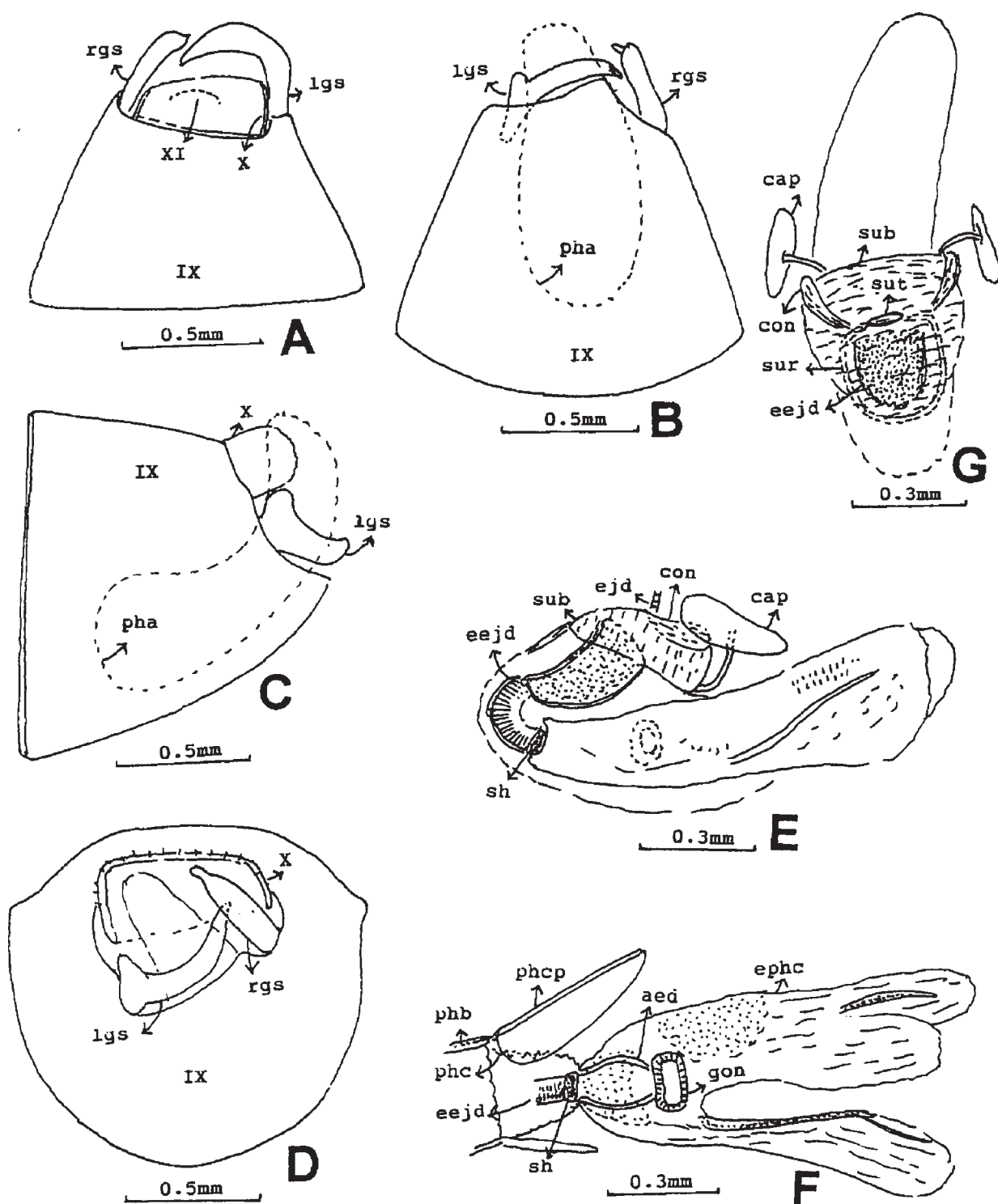


Fig. 87. *Castanopsides falkovitshi*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. aedeagus in complete eversion, lateral view; G. phallus, dorsal view.

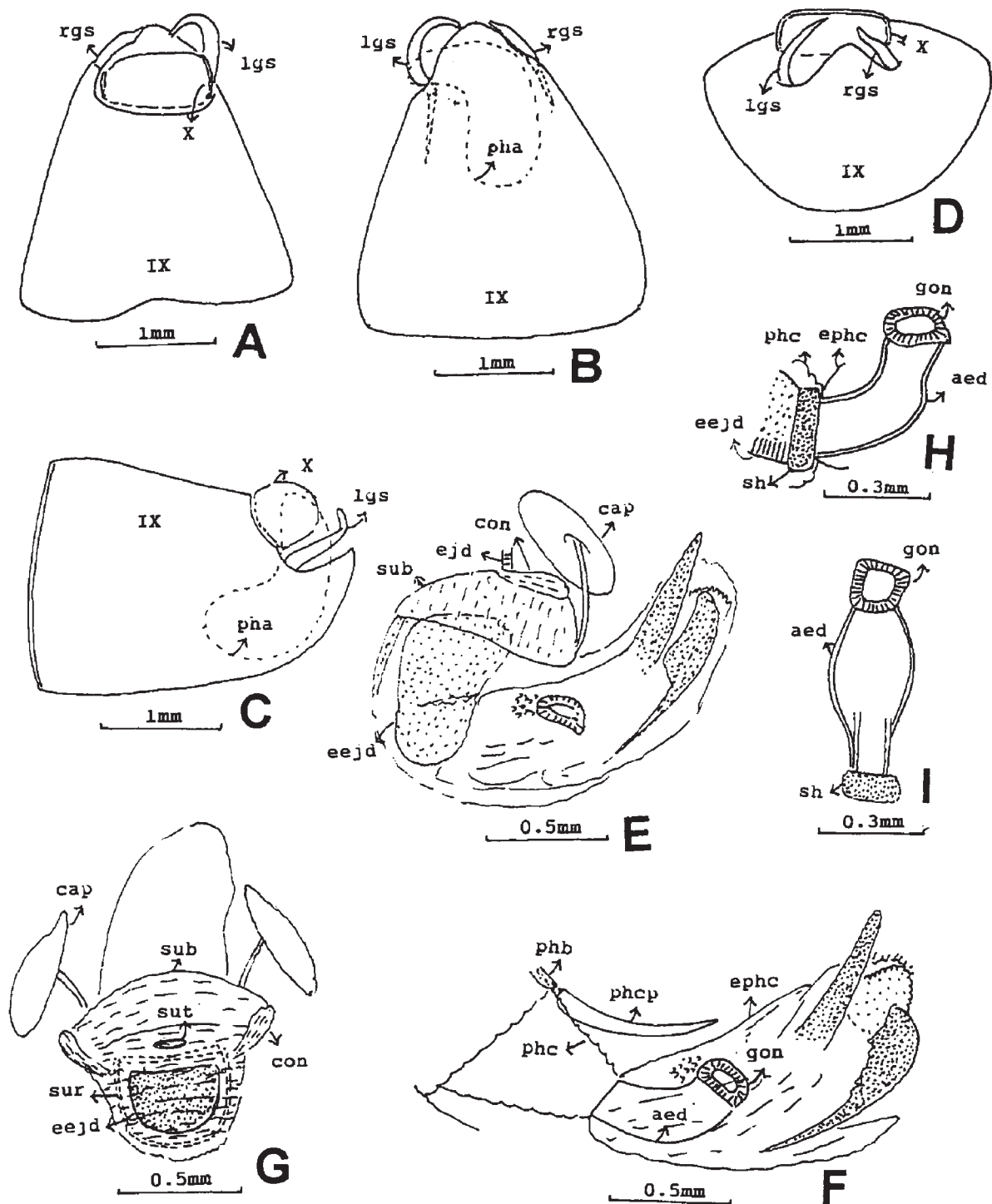


Fig. 88. *Cheilocapsus nigrescens*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. aedeagus in complete eversion, lateral view; G. phallus, dorsal view; H. aedeagus, lateral view; I. the same, dorsal view.

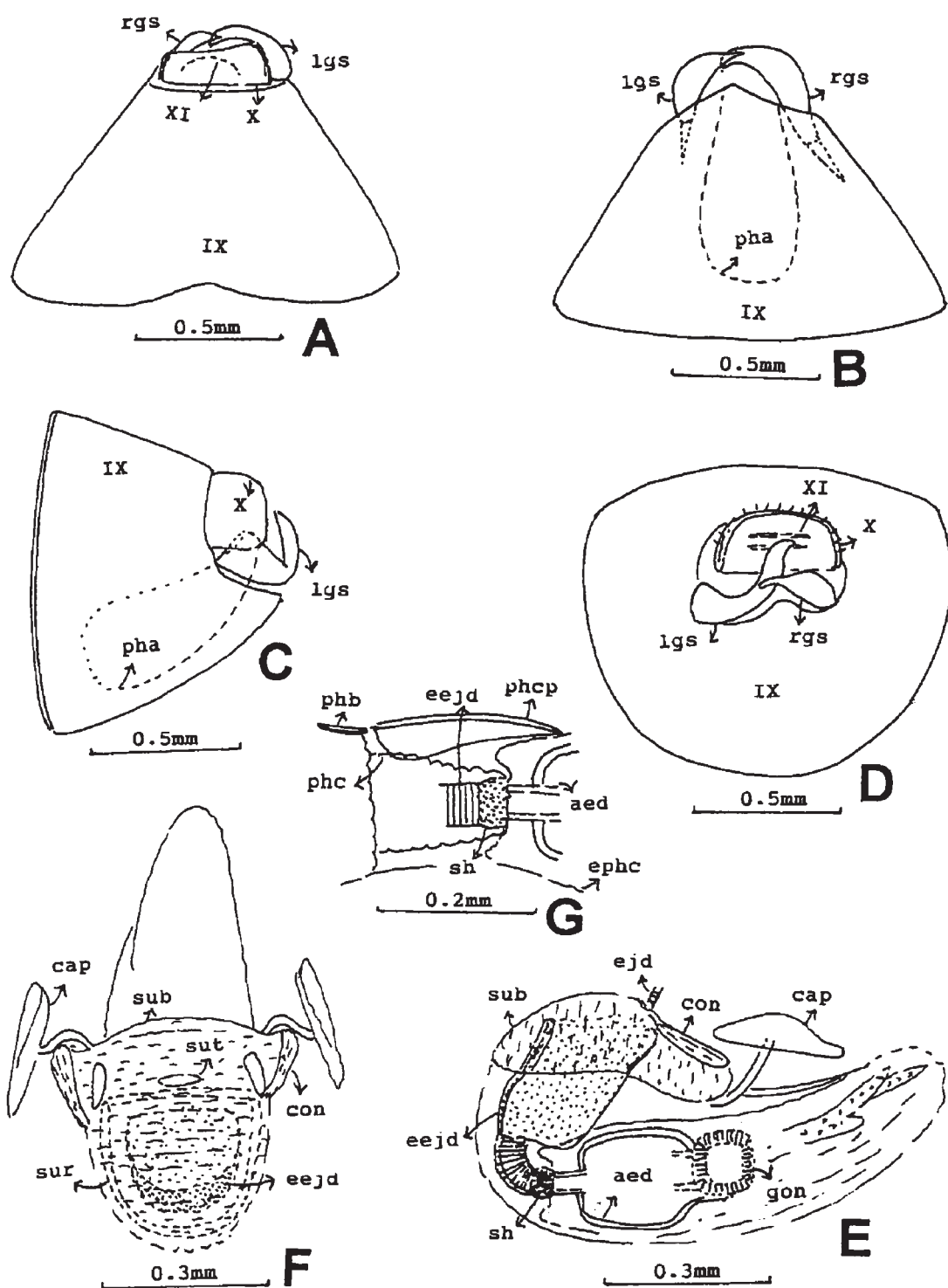


Fig. 89. *Apolygus evonymi*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. phallobasal conjunctiva in complete eversion, lateral view.

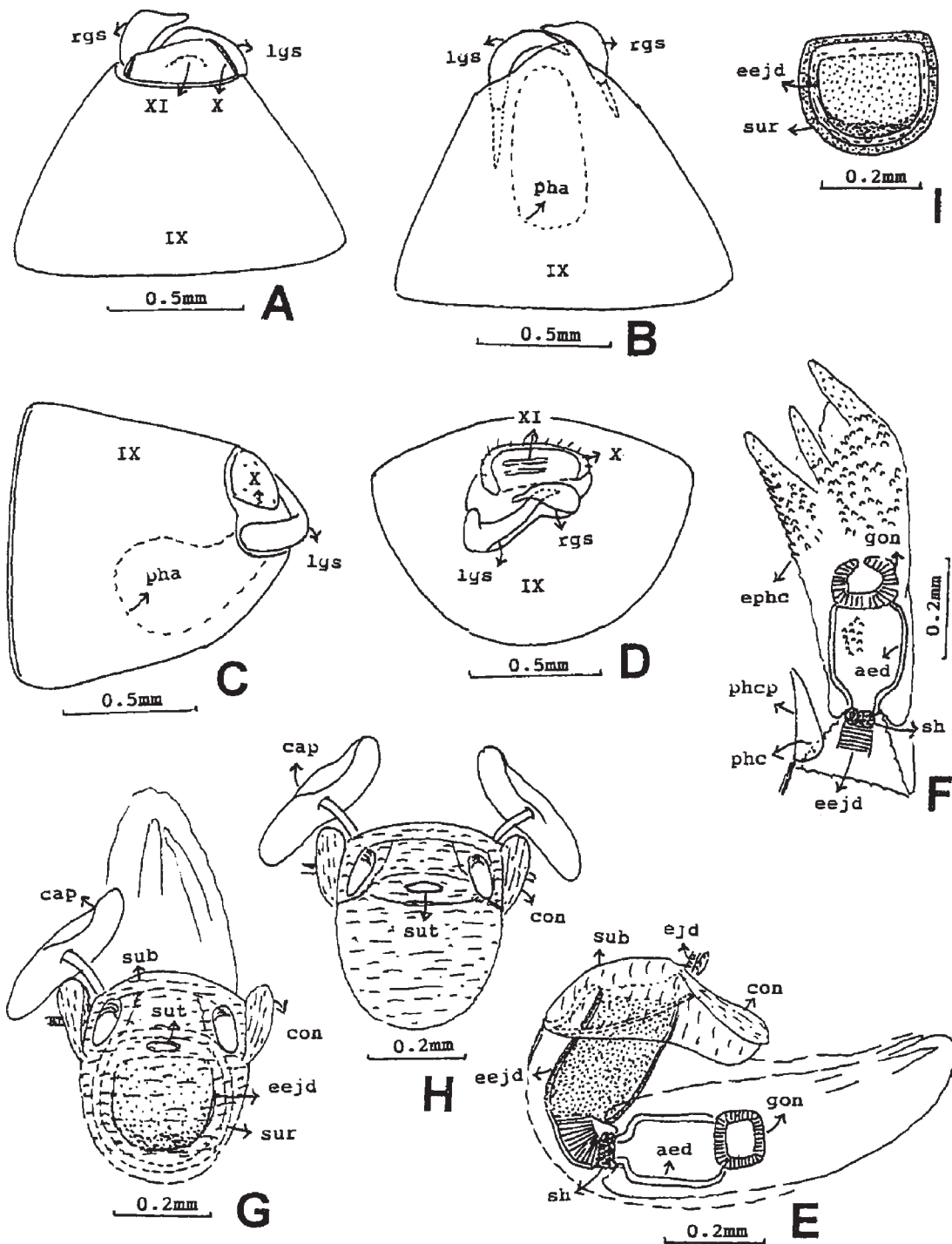


Fig. 90. *Apolygus triangulus*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. aedeagus in complete eversion, lateral view; G. phallus, dorsal view; H. support bridge and support tube, dorsal view; I. support ring and expanded ejaculatory duct, dorsal view.

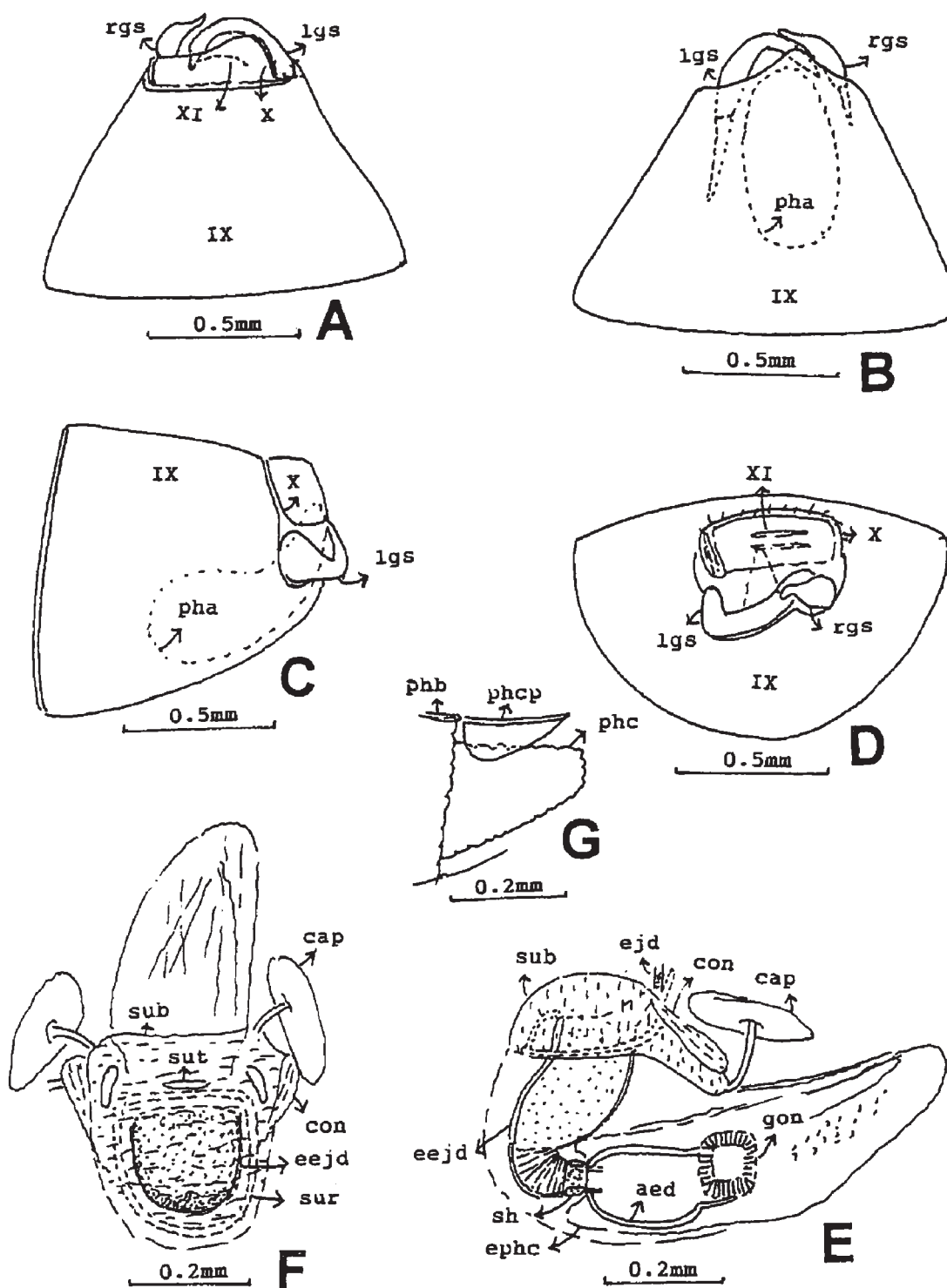


Fig. 91. *Apolygus spinolae*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. phallobasal conjunctiva in complete eversion, lateral view.

92. *Apolygus zhengianus* Kerzhner et Schuh, 1998
Fig. 92

Apex of abdominal tergite IX 0.40 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, acutely produced caudad somewhat to right. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates arched, uniformly wide. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed, both dorsolateral portions winged, directed cephalad. Capitae processes small. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part elongate quadrate, lightly pigmented, not spiraled; apical part spiraled. Sheath short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber not examined. Exposed phallobasal conjunctiva bulbous. Aedeagus shortened, subquadrate. Gonopore defined, with transverse ridges, quadrate, directed to left.

Specimen examined: 1 male (paratype). China: Sichuan Prov., Lixian. 5 Aug. 1963. F. K. Tso.

93. *Apolygus nigricans* (Wang et Zheng, 1982)
Fig. 93

Apex of abdominal tergite IX 0.39 times width of widest portion; apical margin shallowly emarginated. Sternite with strongly asymmetrical apex, acutely produced caudad somewhat to right. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes rather large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part elongate quadrate, lightly pigmented, not spiraled; apical part spiraled. Sheath short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one about 1/3 of phallobase. Exposed phallobasal conjunctiva bulbous, dorsocaudal portion with 2 pigmented processes. Aedeagus shortened, subquadrate expanded in lateral view. Gonopore defined, with

transverse ridges, quadrate, directed to left.

Specimen examined: 1 male (paratype). China: Fujian Prov., Chongan. 19 June 1965. Sheng-Li Liu.

94. *Apolygus kosempoensis* (Poppius, 1915)
Fig. 94

Apex of abdominal tergite IX 0.39 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, roundly produced caudad somewhat to left. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates arched, uniformly wide. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part subquadrate, lightly pigmented, not spiraled; apical part spiraled. Sheath short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, dorsal one small, triangular. Exposed phallobasal conjunctiva bulbous, with 4 pigmented processes. Aedeagus shortened, gradually diverging to apex. Gonopore defined, with transverse ridges, quadrate, directed to left.

Specimen examined; 1 male. Taiwan: Nantou Co., Huisun. 20 Feb. 1990. C. S. Tsing. NMNS ENT 629-6759. Det. by C. S. Lin.

95. *Lygocoris linnavuorii* Lu et Zheng, 2001
Fig. 95

Apex of abdominal tergite IX 0.40 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, acutely produced near middle. Abdominal segment X transverse. Abdominal segment XI not examined. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes extremely large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part elongate quadrate, heavily pigmented, not spiraled; apical part spiraled. Sheath short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal

conjunctival processes exposed in genital chamber, width of base of dorsal one about 1/3 of phallobase. Exposed phallobasal conjunctiva bulbous, with single process. Aedeagus shortened, basal 1/3 narrow, apical 2/3 widened. Gonopore defined, with transverse ridges, quadrate, directed to left.

Specimen examined (paratype). China: Yunnan Prov. 6 May 1984. Le-yi Zheng.

96. *Lygocoris* sp.
Fig. 96

Apex of abdominal tergite IX 0.54 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, acutely produced somewhat to left. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes large. Support tube upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part broad, heavily pigmented, not spiraled; apical part spiraled. Sheath short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one about 1/2 of phallobase. Exposed phallobasal conjunctiva bulbous. Aedeagus shortened, basal 1/4 narrow, apical 3/4 quadrate. Gonopore defined, with transverse ridges, ovate, directed to left.

Specimen examined: 1 male. Taiwan: Nantou, Huisun. 20 Feb. 1990. C. S. Tseng. NMNS ENT 629-6699. Det. by C. S. Lin.

97. *Orthops mutans* (Stal, 1858)
Fig. 97

Apex of abdominal tergite IX 0.48 times width of widest portion; apical margin slightly oblique, shallowly emarginated. Sternite with asymmetrical apex, acutely produced caudad somewhat to right. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed, dorsolateral portions winged, directed laterad. Capitae processes moderately large. Support tube not

upraised. Sheath small. Expanded ejaculatory duct separated into 2 parts; basal part subquadrate, lightly pigmented, not spiraled; apical part spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber not examined. Exposed phallobasal conjunctiva bulbous. Aedeagus shortened, apex of basal 1/3 angulately widened. Gonopore defined, with transverse ridges, ovate, directed to left.

Specimen examined: 1 male. China: Sichuan Prov., Xiaojin. 16 Aug. 1963. Le-yi Zheng.

98. *Pinalitus rubricatus* (Fallen, 1807)
Fig. 98

Apex of abdominal tergite IX 0.59 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, obtusely produced caudad somewhat to right. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed, dorsolateral portions winged, directed dorsolaterad. Capitae processes moderately large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part subquadrate, lightly pigmented, not spiraled; apical part spiraled. Sheath quadrate. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one about 1/2 of phallobase. Exposed phallobasal conjunctiva bulbous, apical 1/2 2-lobed, each with an exposed process. Aedeagus shortened, elongate oval in dorsal view. Gonopore defined, with transverse ridges, ovate, directed to left and dorsolaterad.

Specimen examined: 1 male. China: Sichuan Prov. 5 Aug. 1963. F. K. Tso.

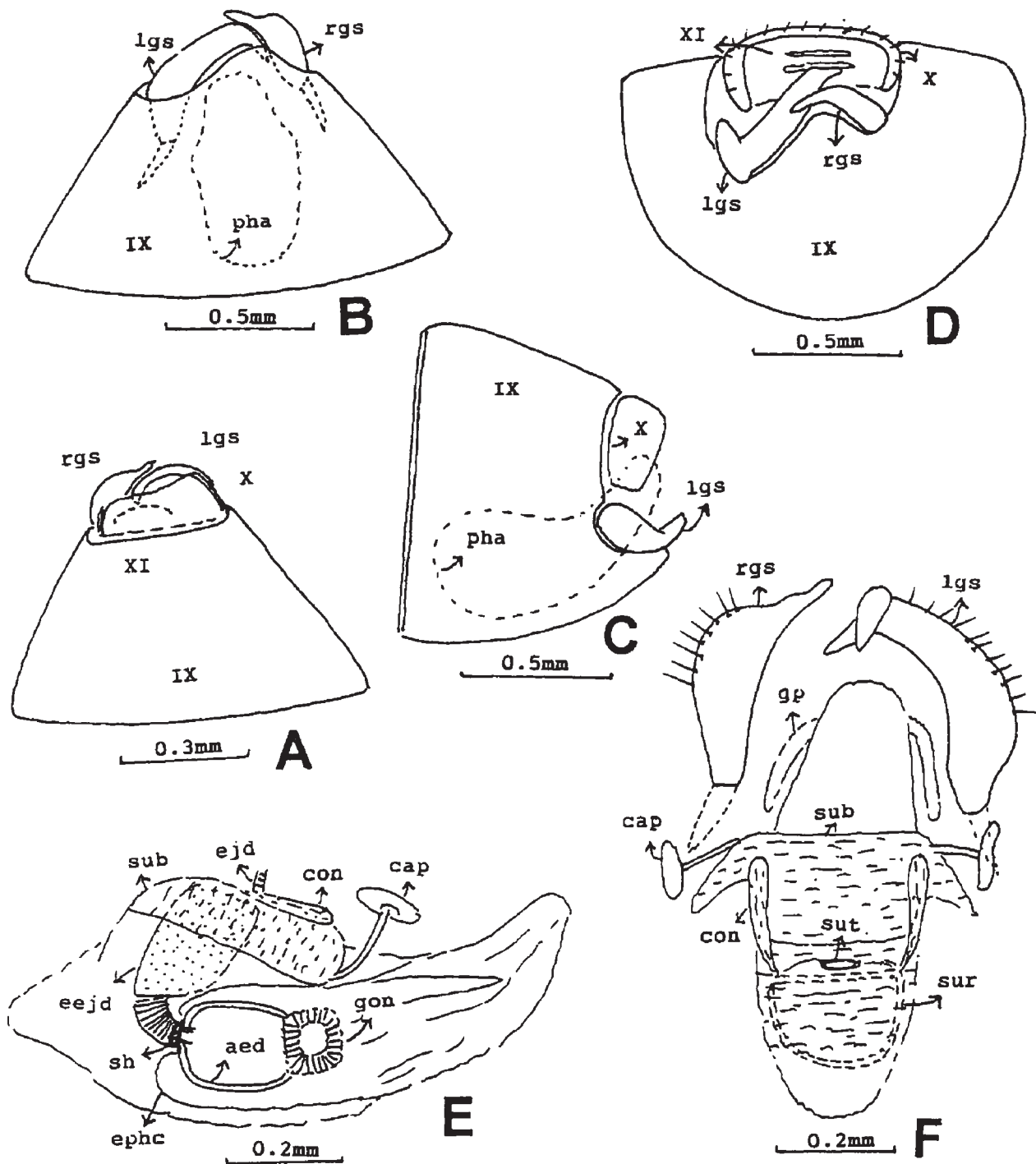


Fig. 92. *Apolypus zhengianus*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. phallus and genital styles, dorsal view.

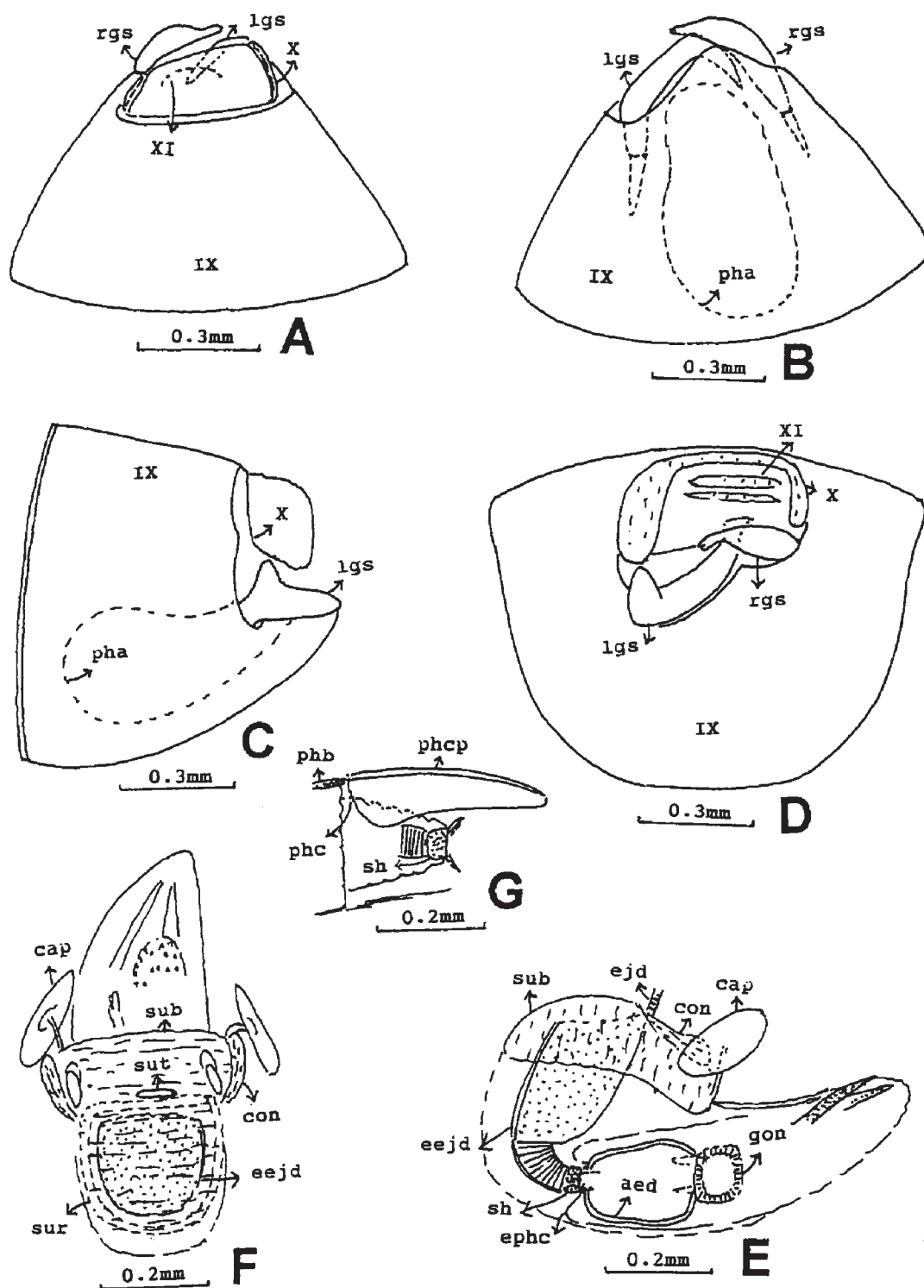


Fig. 93. *Apolygus nigricans*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. phallobasal conjunctiva in complete eversion, lateral view.

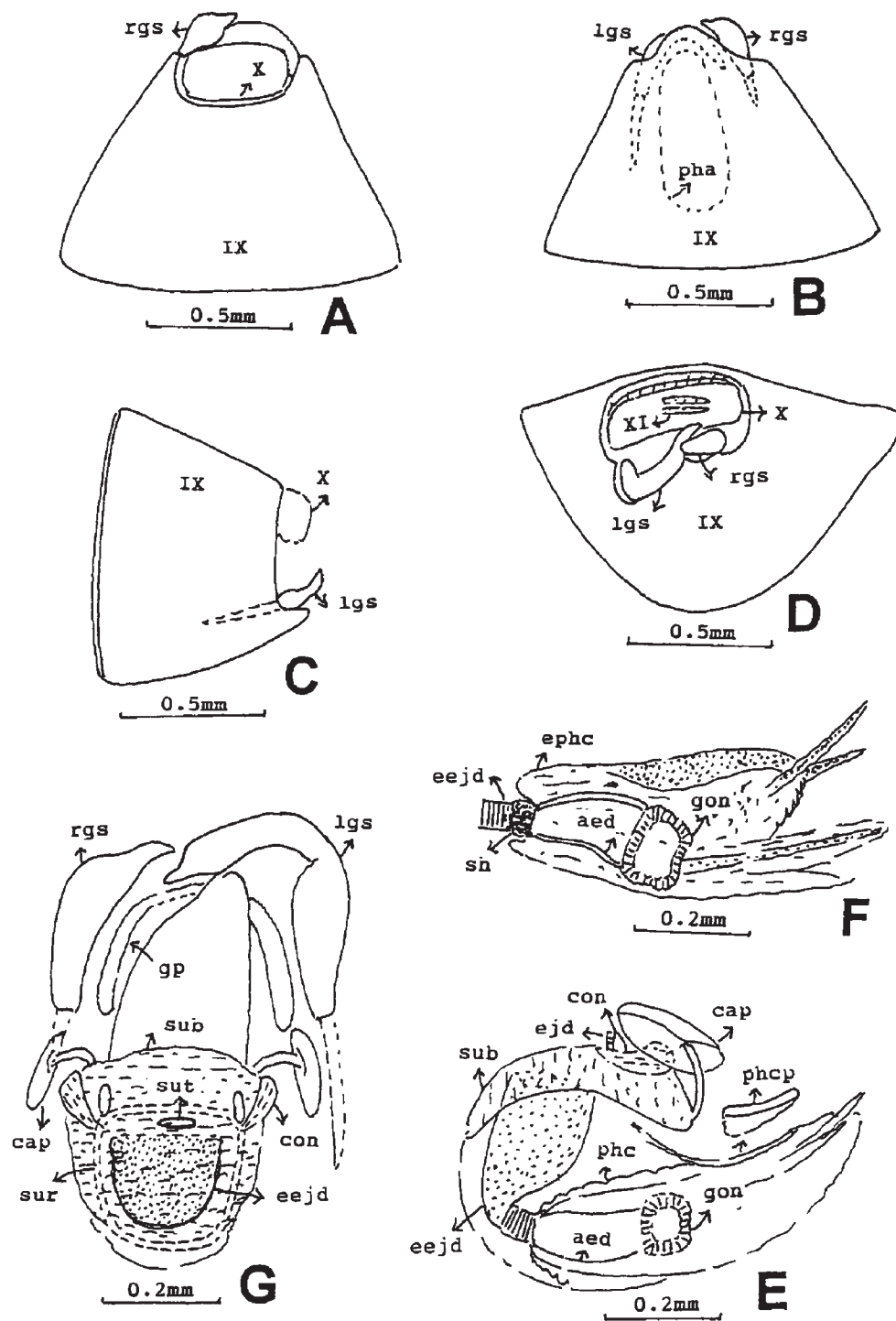


Fig. 94. *Apolygus kosempoensis*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. aedeagus in complete eversion, lateral view; G. phallus and genital styles, dorsal view.

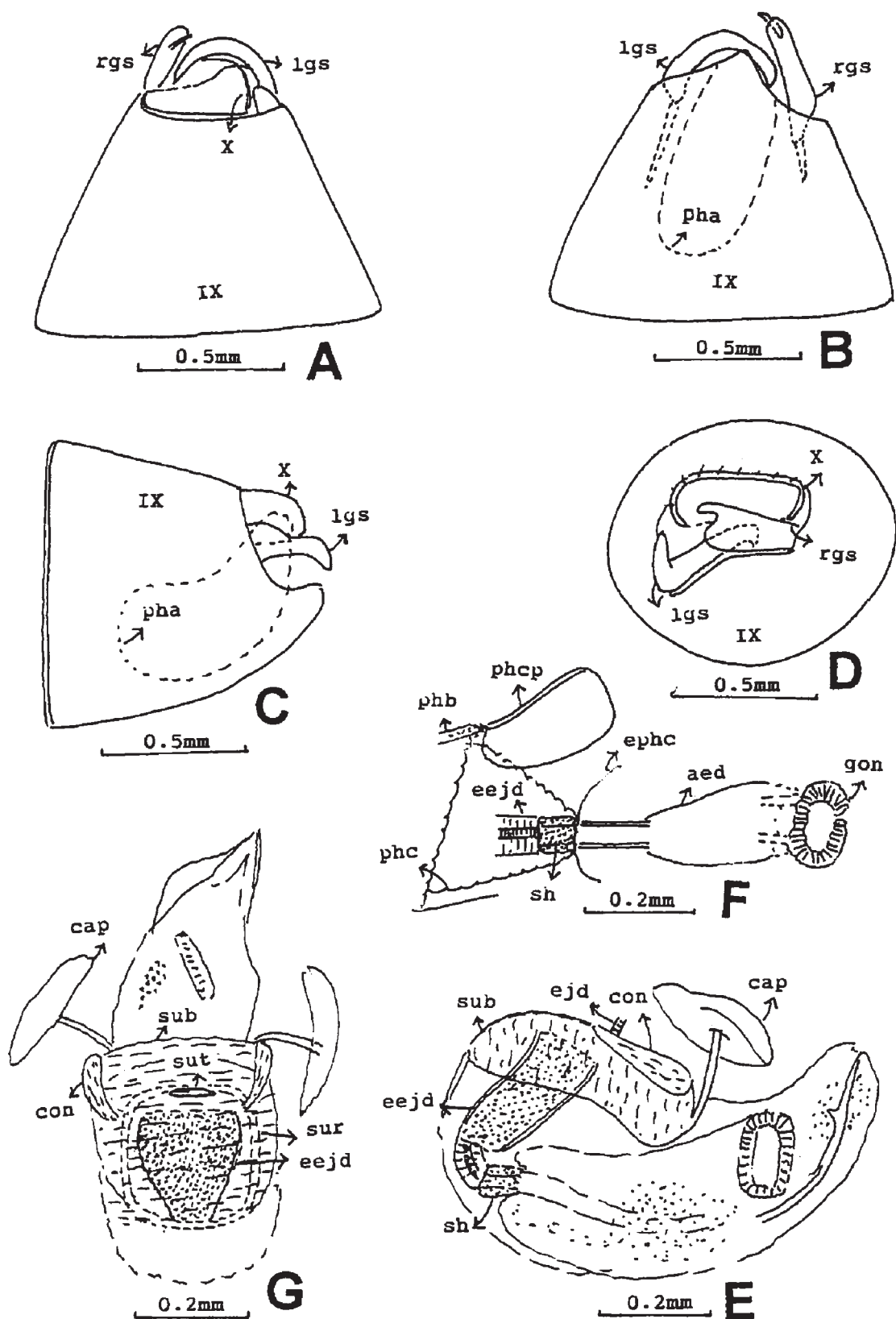


Fig. 95. *Lygocoris linnavuorii*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. aedeagus in complete eversion, lateral view; G. phallus, dorsal view.

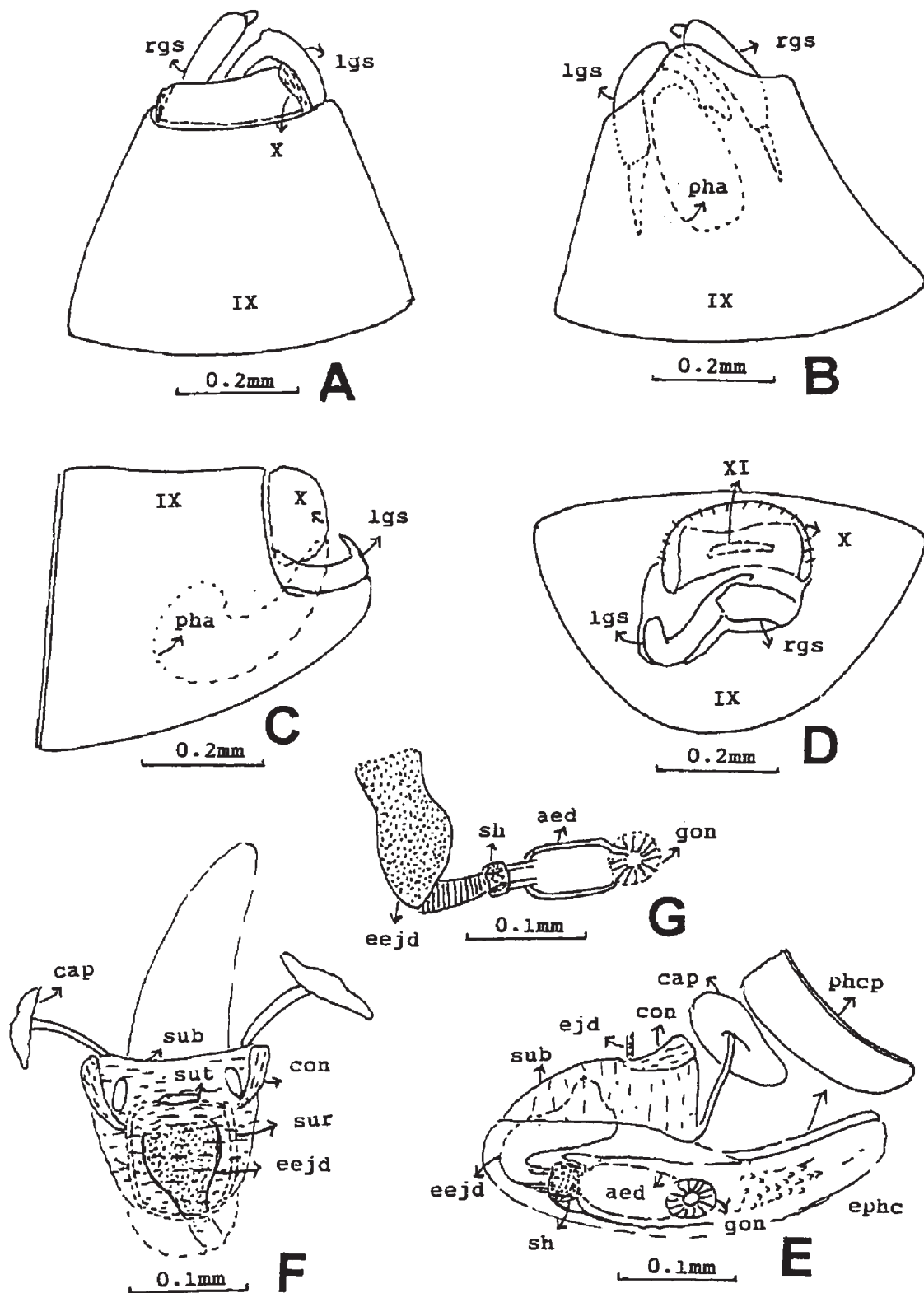


Fig. 96. *Lygocoris* sp. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. aedeagus, lateral view.

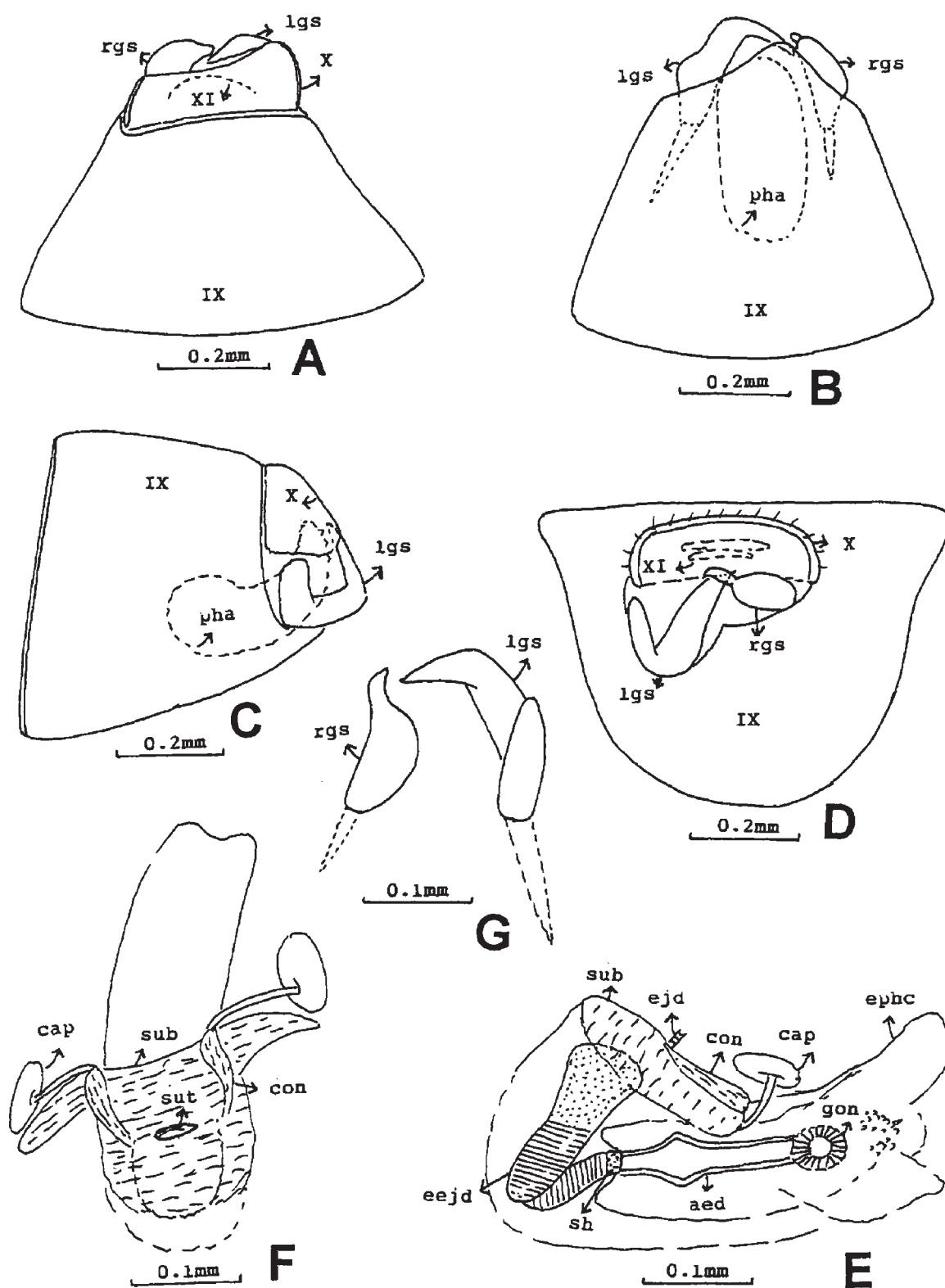


Fig. 97. *Orthops mutans*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. genital styles, dorsal view.

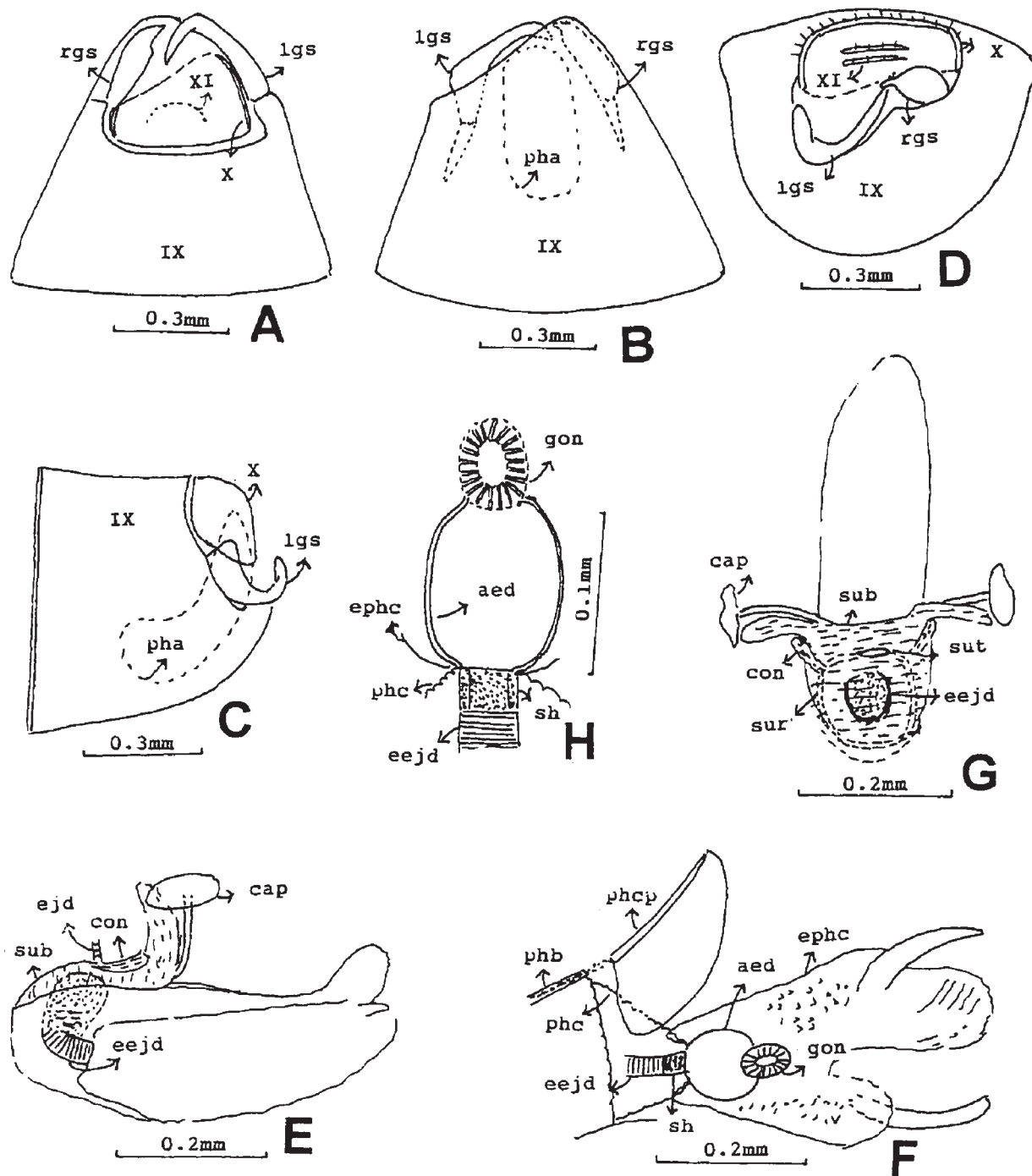


Fig. 98. *Pinalitus rubricatus*. A. Abdominal segments IX-XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. aedeagus in complete eversion, lateral view; G. phallus, dorsal view; H. aedeagus and sheath, dorsal view.

99. *Apolygus emeia* (Zheng et Wang, 1983)
Fig. 99

Apex of abdominal tergite IX 0.40 times width of widest portion; apical margin very shallowly emarginated. Sternite with asymmetrical apex, right 2/3 roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates arched, both ends somewhat expanded. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes extremely large. Support tube rather upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part rather stout, anterior margin heavily pigmented, not spiraled; apical part spiraled. Sheath short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one about 1/2 of phallobase. Exposed phallobasal conjunctiva bulbous. Aedeagus shortened, basal 1/3 narrow, apical 2/3 expanded quadrate. Gonopore defined, with transverse ridges, quadrate, directed to left and dorsolaterad.

Specimen examined: 1 male (paratype). China: Fujian Prov., Lunyan. 20 Aug. 1965. Sheng-Li Liu.

100. *Apolygus castaneus* (Zheng et Wang, 1983)
Fig. 100

Apex of abdominal tergite IX 0.45 times width of widest portion; apical margin very shallowly emarginated. Sternite with symmetrical apex, median portion obtusely produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left somewhat larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes extremely large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part elongate quadrate, heavily pigmented, not spiraled; apical part spiraled. Sheath quadrate. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one about 1/3 of phallobase. Exposed phallobasal conjunctiva bulbous. Aedeagus shortened, basal narrow

portion very short, apical portion expanded quadrate. Gonopore defined, with transverse ridges, quadrate, directed to left.

Specimen examined: 1 male (paratype). China: Sichuan Prov., Emeishan. 10 May 1959.

101. *Lygocoris disciger* (Poppius, 1915)
Fig. 101

Apex of abdominal tergite IX 0.44 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex. Abdominal segment X transverse. Abdominal segment XI not examined. Genital plates arched, uniform width. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes extremely large. Support tube not upraised. Expanded ejaculatory duct separated into 2 parts; basal part subquadrate, heavily pigmented, not spiraled; apical part spiraled. Sheath short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one more than 1/2 of phallobase. Exposed phallobasal conjunctiva bulbous. Aedeagus shortened, basal 1/4 narrow, apical 3/4 roundly expanded. Gonopore defined, with transverse ridges, quadrate, directed to left.

Specimen examined: 1 male. Taiwan: Nantou Co., Huisun. 20 Feb. 1990. C. S. Tsen. NMNS ENT 629-7154. Det. by C. S. Lin.

102. *Phytocoris nowickyi* Fieber, 1870
Fig. 102

Left laterocaudal portion of abdominal segment IX with a process. Apex of abdominal tergite IX 0.53 times width of widest portion; apical margin shallowly emarginated. Sternite with symmetrical apex, median portion roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left slightly larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes extremely large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part narrowed, heavily pigmented, not spiraled; apical part spiraled.

Sheath short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one about 1/2 of phallobase. Exposed phallobasal conjunctiva bulbous, apical 1/2 with an elongate oval marked area. Aedeagus shortened, basal 1/3 narrow, apical 2/3 widened, quadrate. Gonopore defined, with transverse ridges, ovate, directed to left.

Specimen examined: 1 male. China: Mudanjiang. 2 Aug. 1980. Le-yi Zheng.

103. *Orientomiris* sp.

Fig. 103

Left laterocaudal portion of abdominal segment IX with a process. Apex of abdominal tergite IX 0.67 times width of widest portion; apical margin deeply emarginated. Sternite with symmetrical apex, acutely produced caudad medially. Abdominal segment X transverse. Abdominal segment XI not examined. Both ends of genital plates slightly widened. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes extremely large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct separated into 2 parts; basal part subquadrate, lightly pigmented, not spiraled; apical part spiraled. Sheath short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one about 1/4 of phallobase. Exposed phallobasal conjunctiva bulbous. Aedeagus shortened, subparallel-sided. Gonopore defined, with transverse ridges, ovate, directed ventrad.

Specimen examined: 1 male. Taiwan: Nantou Co., Huisun. 20 Feb. 1990. C. S. Tseng. NMNS ENT 629-7110. Det. by C. S. Lin.

104. *Charagochilus angusticollis* Linnavuori, 1961

Fig. 104

Apex of abdominal tergite IX 0.43 times width of widest portion; apical margin shallowly emarginated obliquely. Sternite with asymmetrical apex, right 3/4 roundly produced caudad. Abdominal segment X transverse, directed to right and laterocaudad. Abdominal segment XI retracted into segment X. Genital plates not

examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes moderately large. Support tube upraised. Expanded ejaculatory duct not separated into 2 parts, lightly pigmented, not spiraled. Sheath undifferentiated. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one about 1/4 of phallobase. Exposed phallobasal conjunctiva bulbous, with a pigmented process. Aedeagus shortened, parallel-sided, slightly arched upward near middle. Gonopore defined, with transverse ridges, ovate, directed to left.

Specimen examined: 1 male. Taiwan: Taichung Co., Anmashan. 15 July 1983. C. T. Yang. NMNS ENT 220-14166. Det. by C. S. Lin.

105. *Charagochilus taivanus* (Poppius, 1915)

Fig. 105

Abdominal segment IX trapezoid with slightly convex lateral margins. Apex of abdominal tergite IX 0.58 times width of widest portion; apical margin slightly emarginated. Sternite with asymmetrical apex, right 6/7 roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed, rather wide, elongate quadrate, empty above support tube. Capitae processes rather large. Support tube upraised. Expanded ejaculatory duct not separated into 2 parts, not spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one about 1/2 of phallobase. Exposed phallobasal conjunctiva bulbous, with 2 pigmented processes. Aedeagus shortened, parallel-sided. Gonopore defined, with transverse ridges, ovate, directed to left.

Specimen examined: 1 male. Taiwan: Taitung Co., Chihpen. 11 Jan. 1989. K. W. Huang. NMNS ENT 428-282. Det. by C. S. Lin.

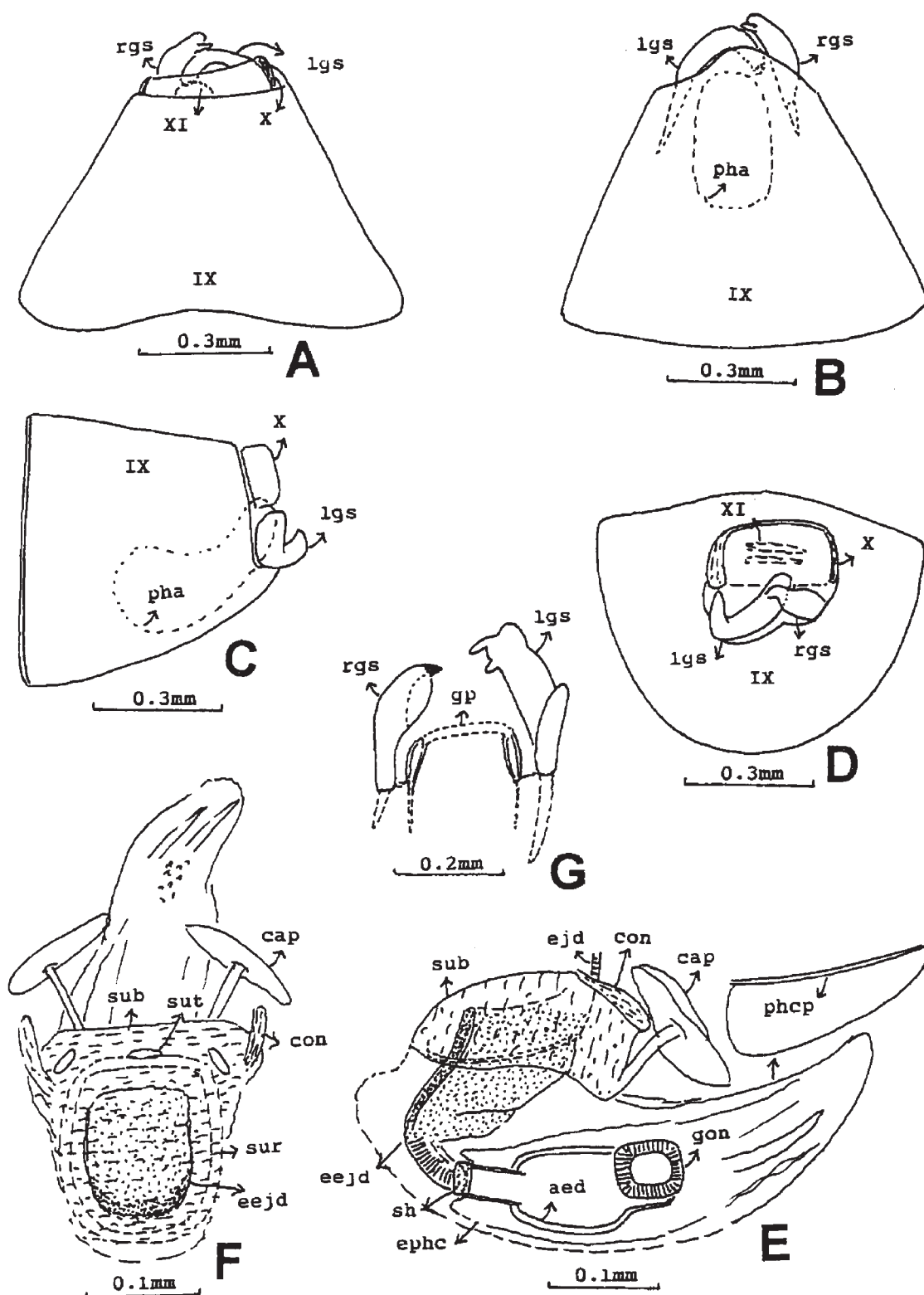


Fig. 99. *Apolygus emeia*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. genital plates and genital styles, dorsal view.

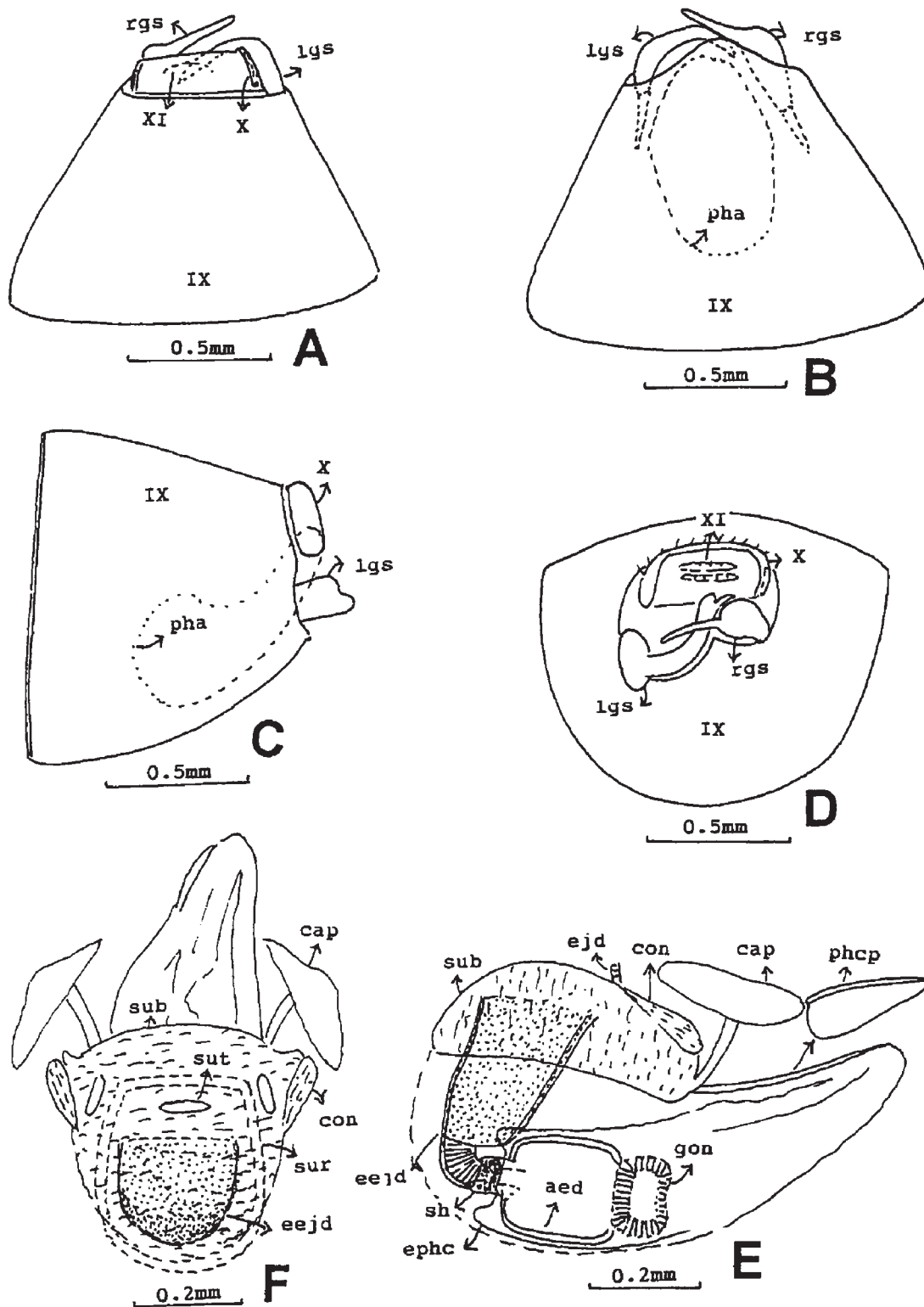


Fig. 100. *Apolygus castaneus*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view.

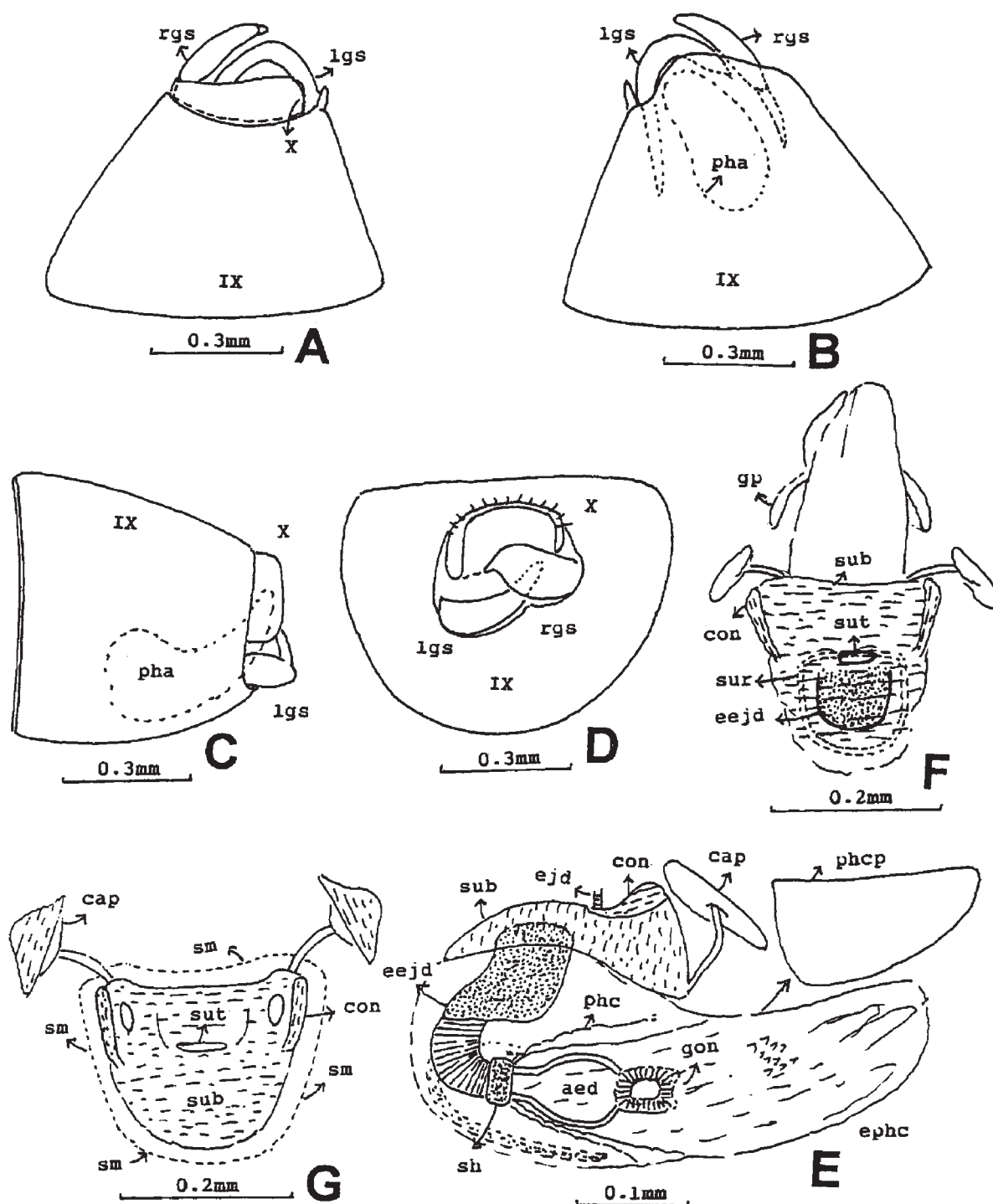


Fig. 101. *Lygocoris disciger*. A Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. support bridge, support tube, and segmental membrane, dorsal view.

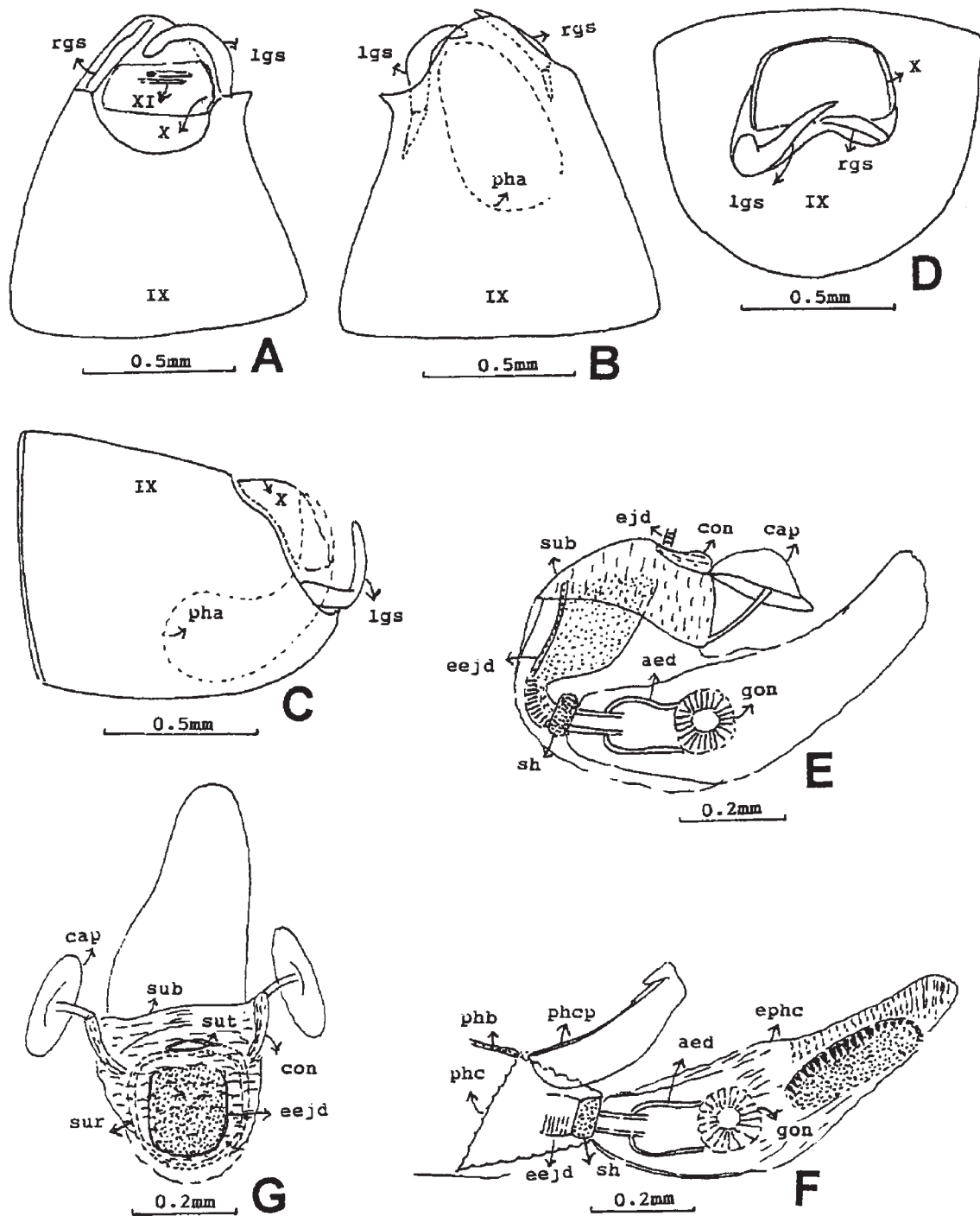


Fig.102. *Phytocoris nowickyi*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. aedeagus in complete eversion, lateral view; G. phallus, dorsal view.

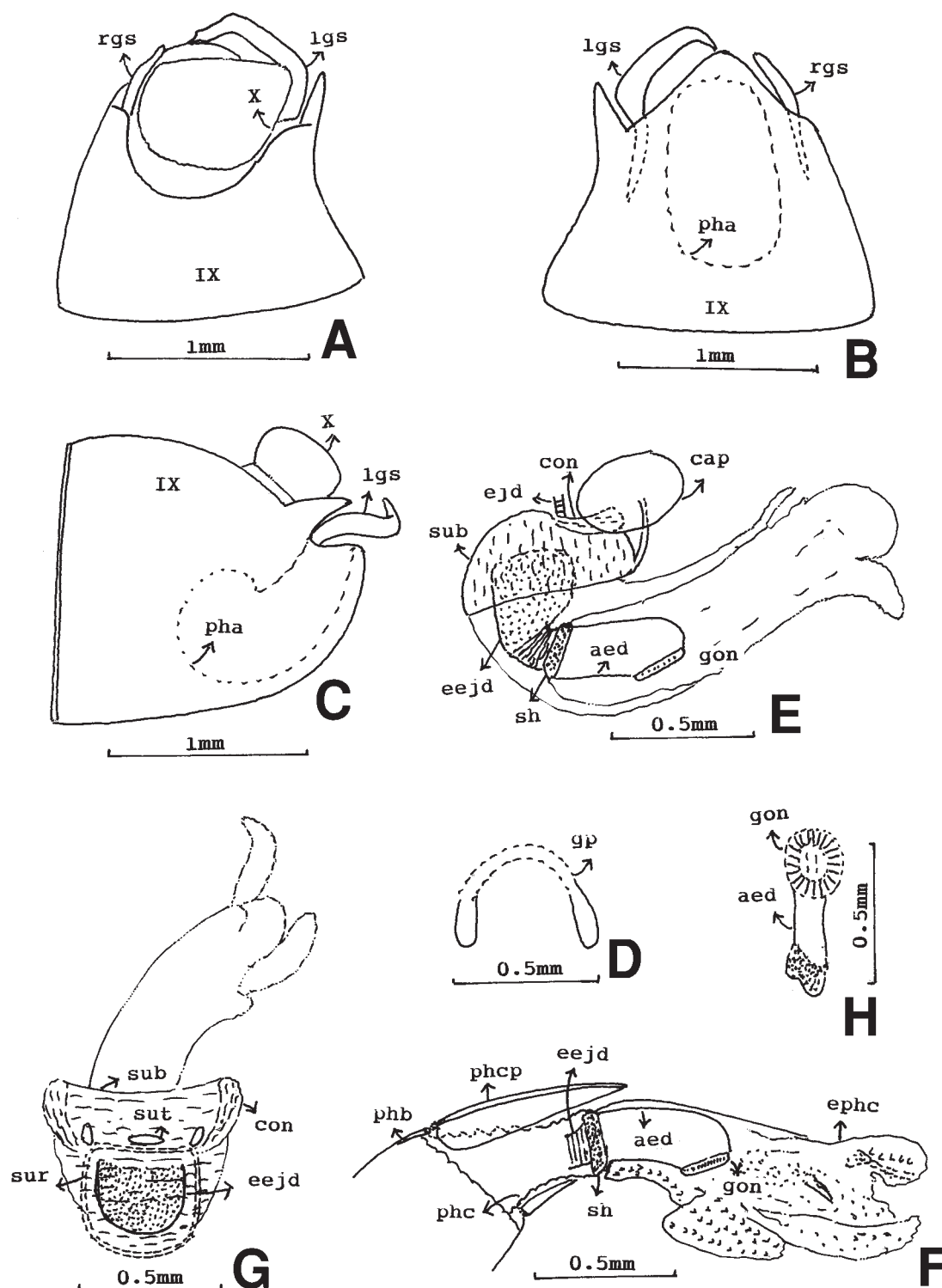


Fig. 103. *Orientomiris* sp. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. genital plates, dorsal view; E. phallus, lateral view; F. aedeagus in complete eversion, lateral view; G. phallus, dorsal view; H. aedeagus and sheath, dorsal view.

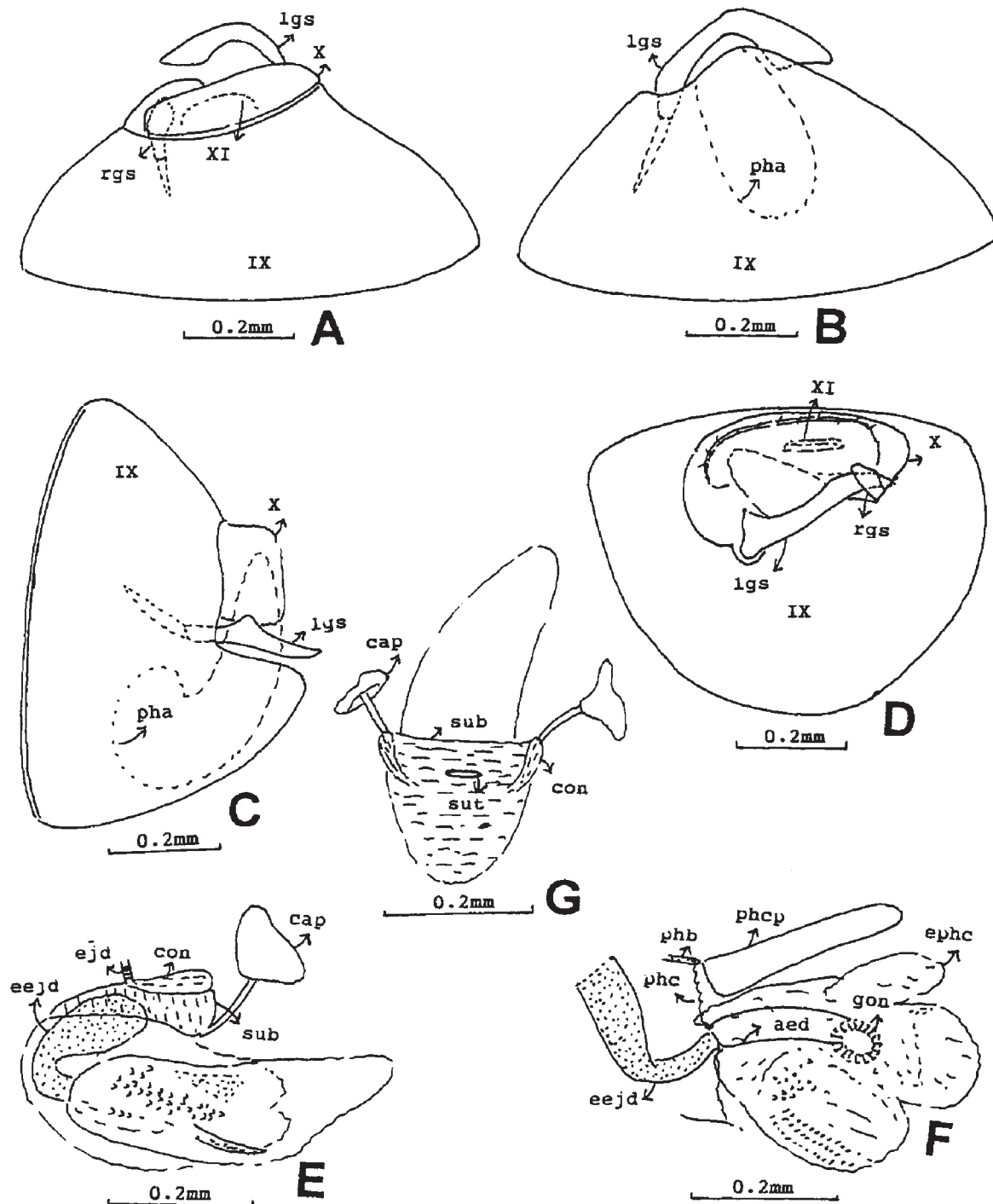


Fig. 104. *Charagochilus angusticollis*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. aedeagus in complete eversion, lateral view; G. phallus, dorsal view.

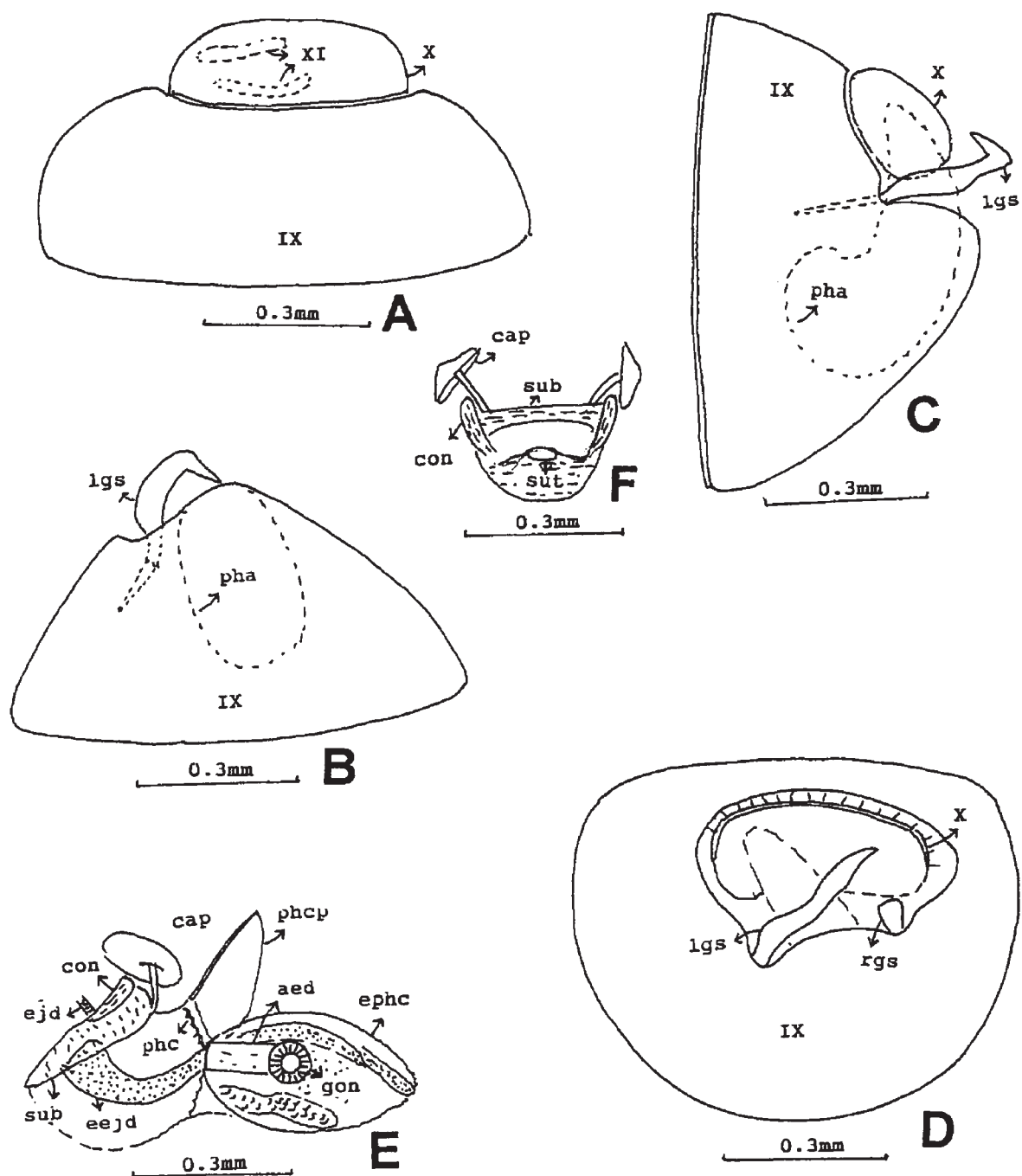


Fig. 105. *Charagochilus taivanus*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. support bridge and support tube, dorsal view.

106. *Proboscidocoris* sp.

Fig. 106

Apex of abdominal tergite IX 0.48 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, acutely produced caudad somewhat to left. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates arched, uniformly wide. Genital styles asymmetrical, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes moderately large. Support tube not upraised. Expanded ejaculatory duct not separated into 2 parts, converging from middle to apex, lightly pigmented, not spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one about 1/4 of phallobase. Exposed phallobasal conjunctiva bulbous. Aedeagus shortened, subparallel-sided. Gonopore defined, with transverse ridges, ovate, directed to left.

Specimen examined: 1 male. Taiwan: Nantou Co., Huisun. 20 Feb. 1990. C. S. Tseng. NMNS ENT 629-7045. Det. by C. S. Lin.

107. *Tingitotum perlatum* Linnavuori, 1961

Fig. 107

Apex of abdominal tergite IX 0.34 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, acutely produced caudad somewhat to right. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates arched, both ends somewhat expanded. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes moderately large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct not separated into 2 parts, apical 1/3 narrow, lightly pigmented, not spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one about 1/2 of phallobase. Exposed phallobasal conjunctiva bulbous, ventral portion with a long, pigmented process. Aedeagus shortened, parallel-sided. Gonopore defined, with transverse ridges, ovate,

directed to left and lateroventrad.

Specimen examined: 1 male. Taiwan: Hsinchu Co., Guanwu. 25~29 Apr. 1989. C. S. Lin. NMNS ENT 511-418. Det. by C. S. Lin.

108. *Apolygus fuhoshoensis* (Poppius, 1915)

Fig. 108

Apex of abdominal tergite IX 0.45 times width of widest portion; apical margin shallowly emarginated. Sternite with symmetrical apex, median 1/2 roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left slightly larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes extremely large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct not separated into 2 parts, apical 1/3 narrow, lightly pigmented, not spiraled. Sheath short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one more than 1/2 of phallobase. Exposed phallobasal conjunctiva bulbous, with 2 long, pigmented processes, one branched at apex. Aedeagus shortened, median 3/5 roundly expanded dorsoventrally. Gonopore defined, with transverse ridges, quadrate, directed to left.

Specimen examined: 1 male. Taiwan: Nantou Co. Huisun. 11 Jan. 1989. K. W. Huang. NMNS ENT 428-283. Det. by C. S. Lin.

109. *Orthops kalmii* (Linnaeus, 1758)

Fig. 109

Apex of abdominal tergite IX 0.40 times width of widest portion; apical margin not emarginated. Sternite with asymmetrical apex, left laterocaudal margin slightly notched. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed, both dorsolateral ends winged and triangular. Capitae processes moderately large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct not separated into 2 parts, gradually narrowing to apex, lightly pigmented, not spiraled. Sheath short.

Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of apex of dorsal one more than 1/2 of phallobase. Exposed phallobasal conjunctiva bulbous, ventral portion with a long process. Aedeagus shortened, basal and apical 1/4 narrow, median portion expanded, subquadrate. Gonopore defined, with transverse ridges, ovate, directed to left.

Specimen examined: 1 male. China: Sichuan Prov., Xiaojin. 16 Aug. 1963. F. K. Tso.

110. *Orthops scutellatus* Uhler, 1877

Fig. 110

Apex of abdominal tergite IX 0.43 times width of widest portion; apical margin shallowly emarginated. Sternite with slightly asymmetrical apex, left laterocaudal margin somewhat notched. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates arched, both ends expanded. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes comparatively large. Support tube not upraised. Support ring ring-like. Expanded ejaculatory duct not separated into 2 parts, slightly converging to apex, lightly pigmented, not spiraled. Sheath short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one about 2/3 of phallobase. Exposed phallobasal conjunctiva bulbous, apex 2-lobed, dorsal lobe serrated at apex. Aedeagus shortened, basal and apical 1/4 narrow, median portion expanded, subquadrate. Gonopore defined, with transverse ridges, quadrate, directed to left and laterocaudad.

Specimen examined: 1 male. China: Mudanjiang. 2 Aug. 1980. Le-yi Zheng.

111. *Polymerus unifasciatus* (Fabricius, 1794)

Fig. 111

Apex of abdominal tergite IX 0.47 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, left 5/6 roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes moderately large. Support tube somewhat upraised. Support ring ring-like. Expanded ejaculatory duct not separated into 2 parts, lightly pigmented, not spiraled. Sheath short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one more than 1/2 of phallobase. Exposed phallobasal conjunctiva bulbous. Aedeagus shortened, parallel-sided. Gonopore defined, with transverse ridges, directed to left and dorsolaterad.

Specimen examined: 1 male. China: Xinjiang Prov., Changji. 27 Aug. 1959. Y. F. Tian .

112. *Lygus clypealis* (Poppius, 1914)

Fig. 112

Apex of abdominal tergite IX 0.42 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, right 7/8 roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI not wholly retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes extremely large. Support tube not upraised. Support ring subquadrate in dorsal view. Expanded ejaculatory duct not separated into 2 parts, very broad, lightly pigmented, not spiraled. Sheath short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one about 1/2 of phallobase. Exposed phallobasal conjunctiva bulbous. Aedeagus shortened, parallel-sided. Gonopore defined, with transverse ridges, ovate, directed to left and dorsolaterad.

Specimen examined: 1 male. Taiwan: Nantou Co., Huisun. 20 Feb. 1990. C. S. Tseng. NMNS ENT 629-6845. Det. By C. S. Lin.

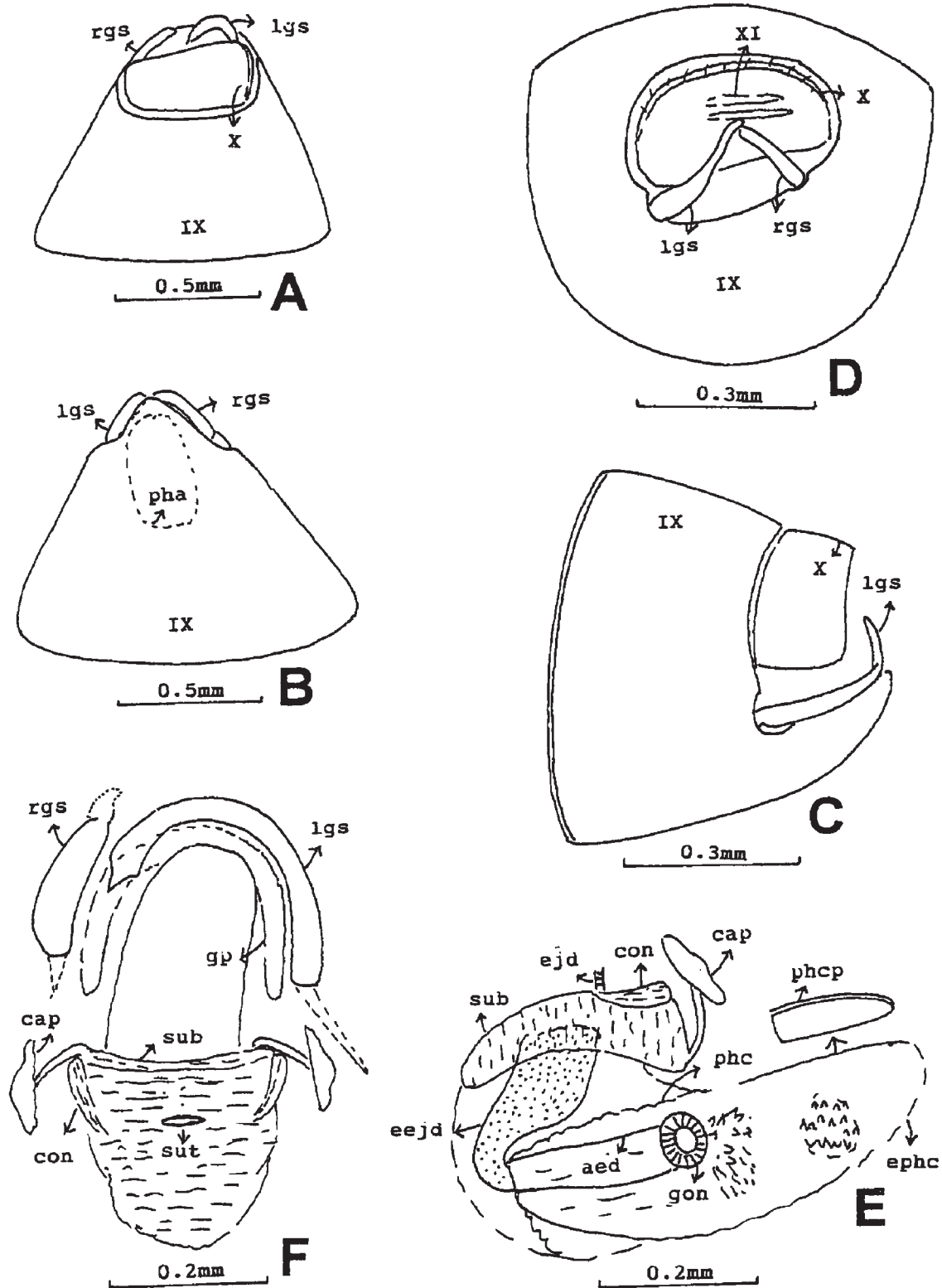


Fig. 106. *Probosciodocoris* sp. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. phallus and genital styles, dorsal view.

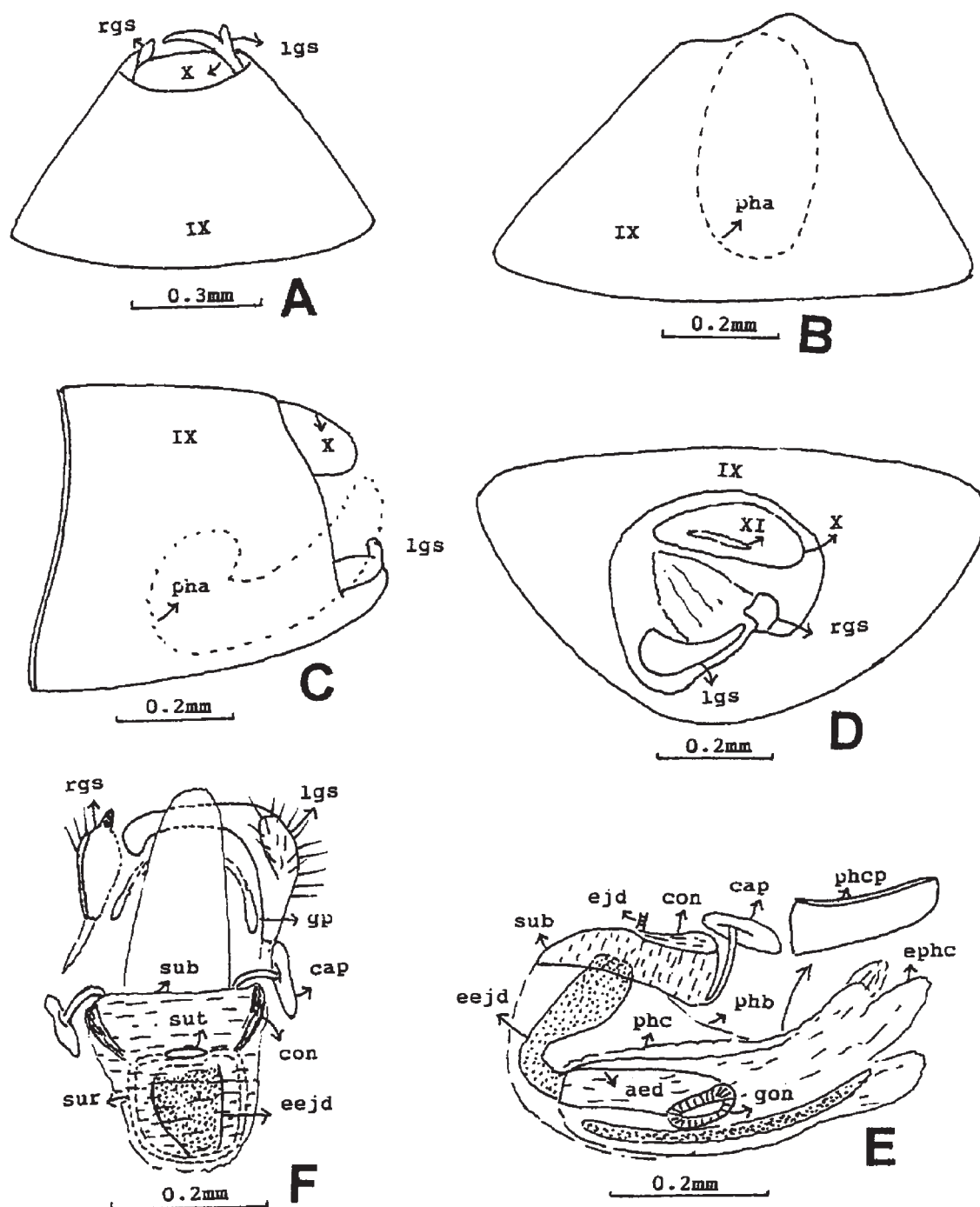


Fig. 107. *Tinginotum perlatum*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view.

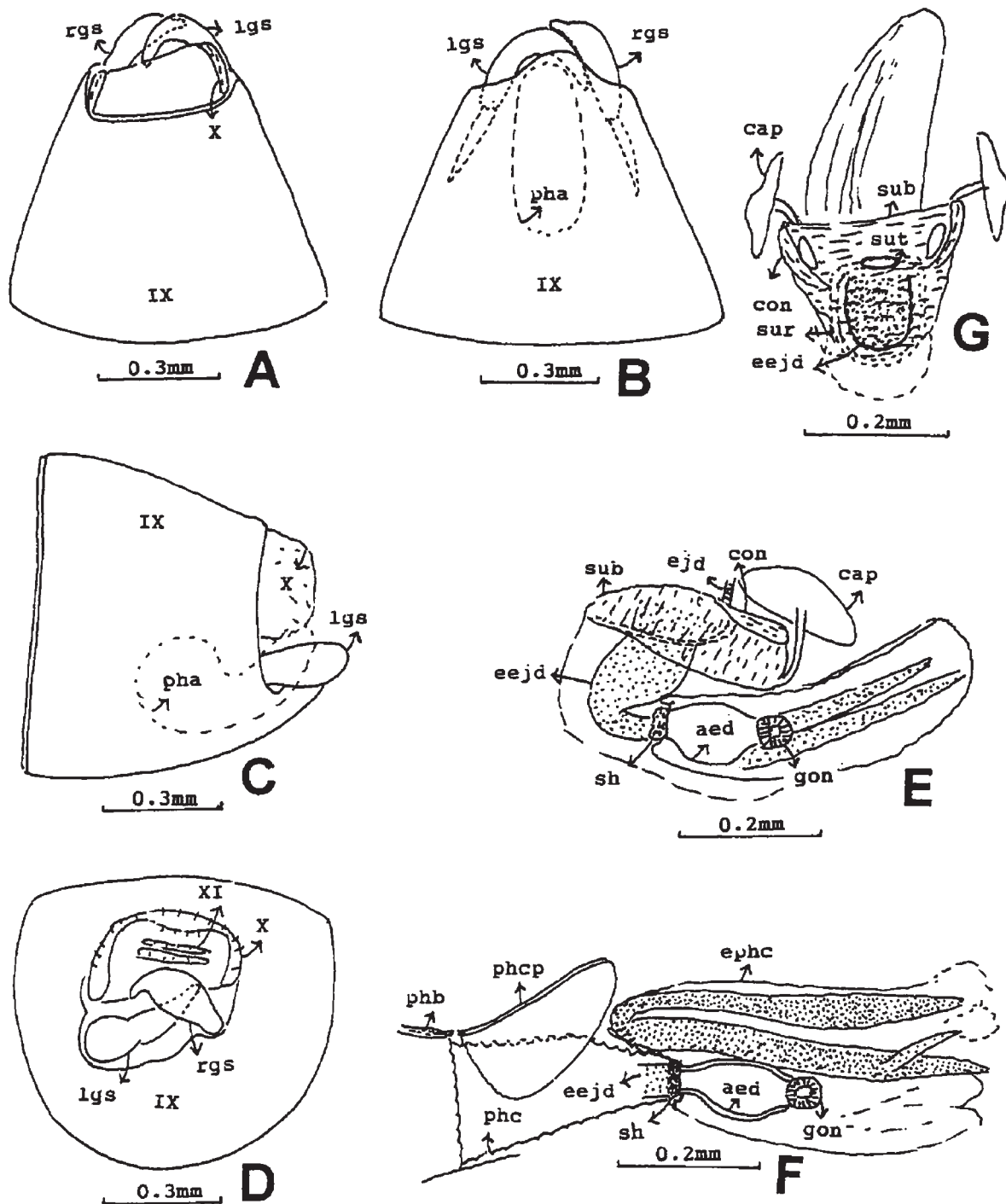


Fig. 108. *Apolygus fuhoshoensis*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. aedeagus in complete eversion, lateral view; G. phallus, dorsal view.

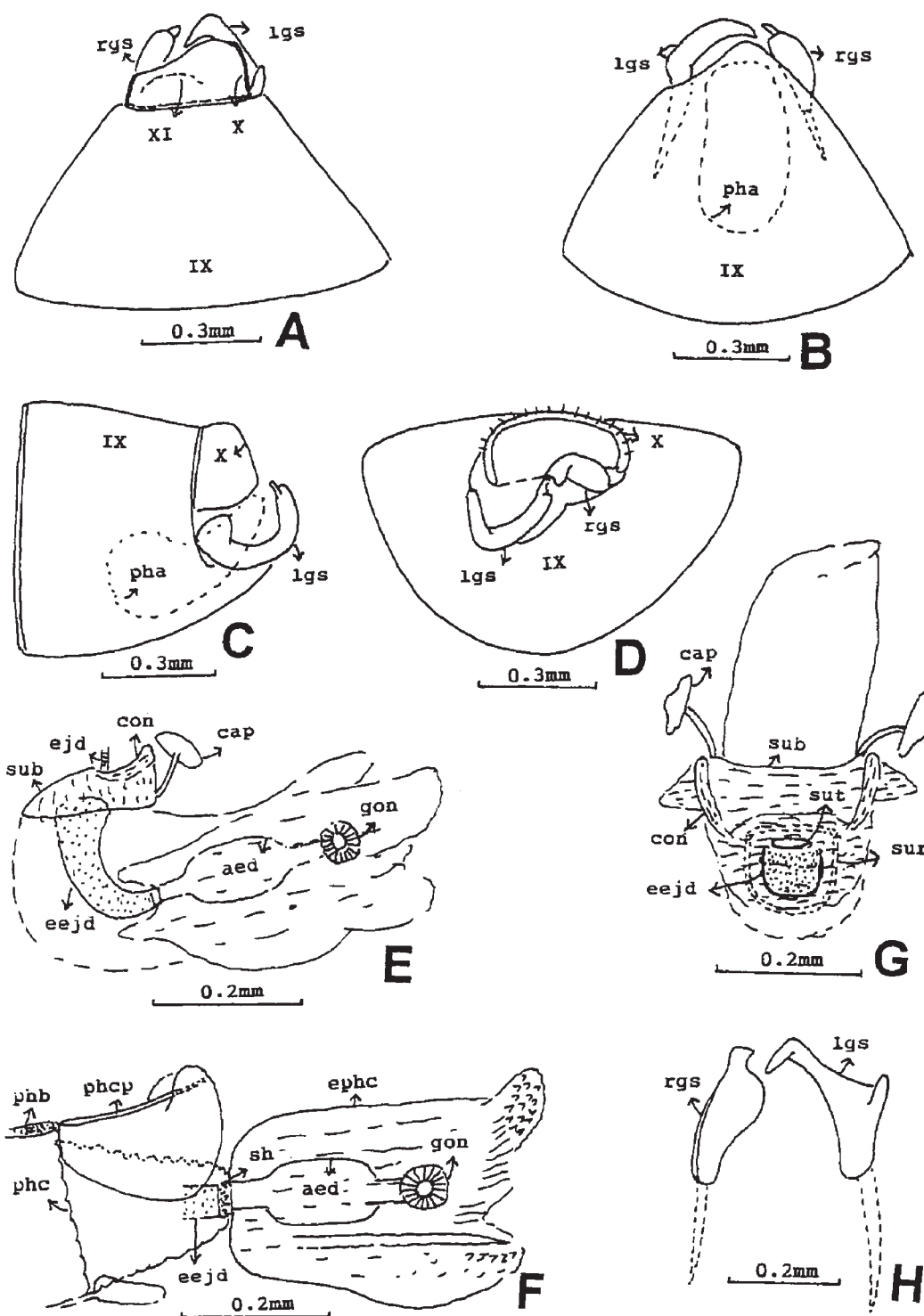


Fig. 109. *Orthops kalmii*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. aedeagus in complete eversion, lateral view; G. phallus, dorsal view; H. genital styles, dorsal view.

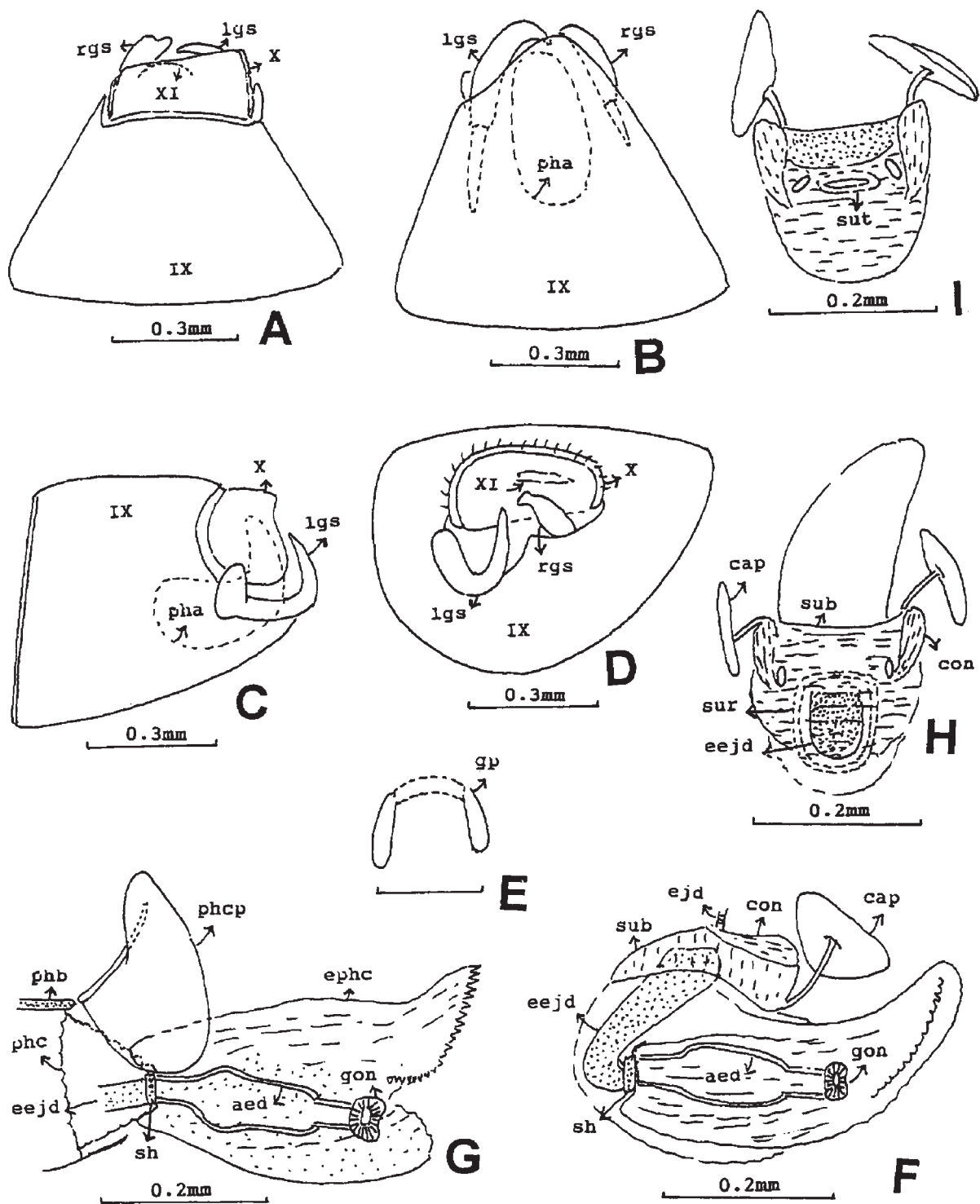


Fig. 110. *Orthops scutellatus*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. genital plates, dorsal view; F. phallus, lateral view; G. aedeagus in complete eversion, lateral view; H. phallus, dorsal view; I. support bridge and support tube, dorsal view.

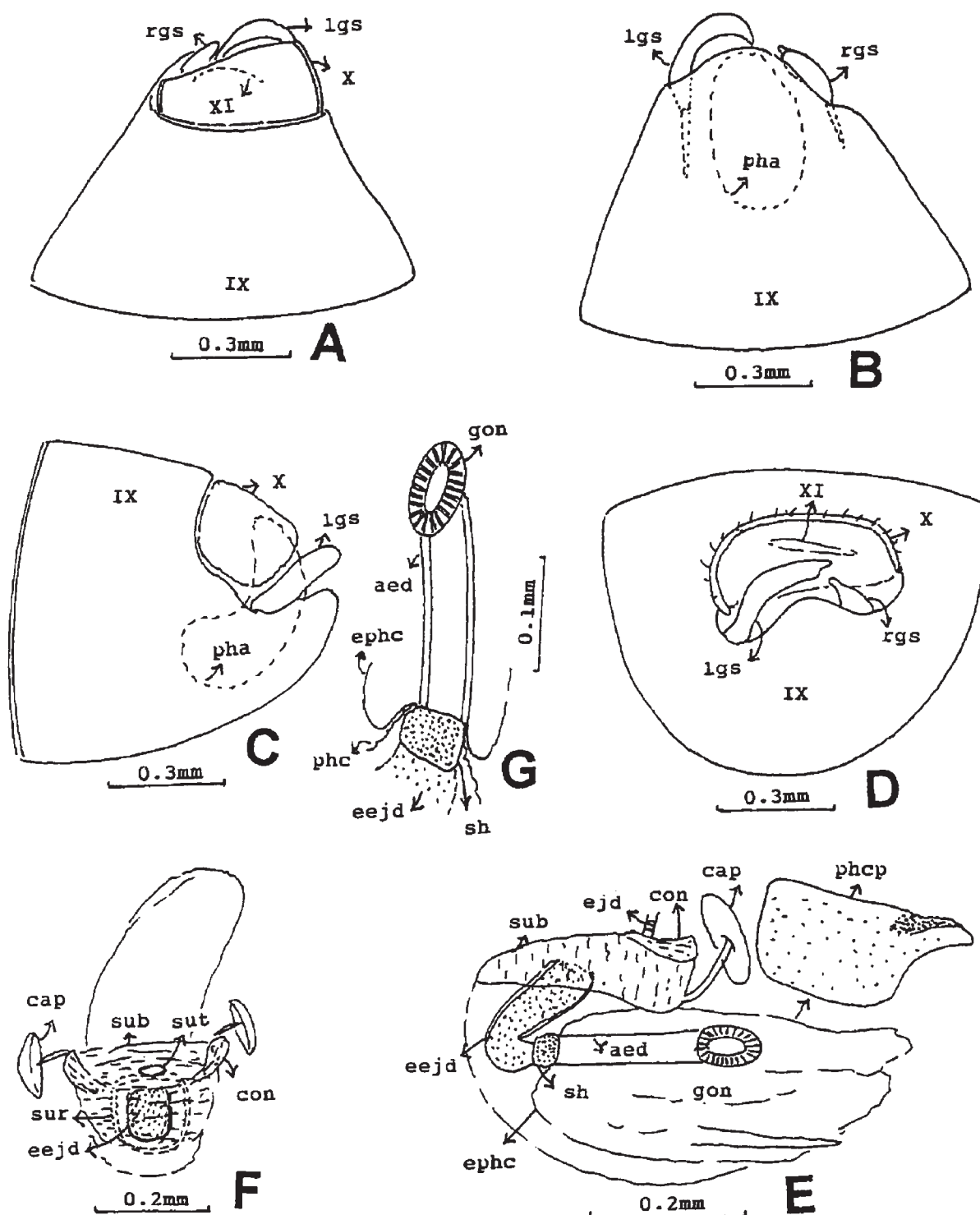


Fig. 111. *Polymerus unifasciatus*. A. Abdominal segments IX-XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. the same, dorsal view; G. aedeagus and sheath, dorsal view.

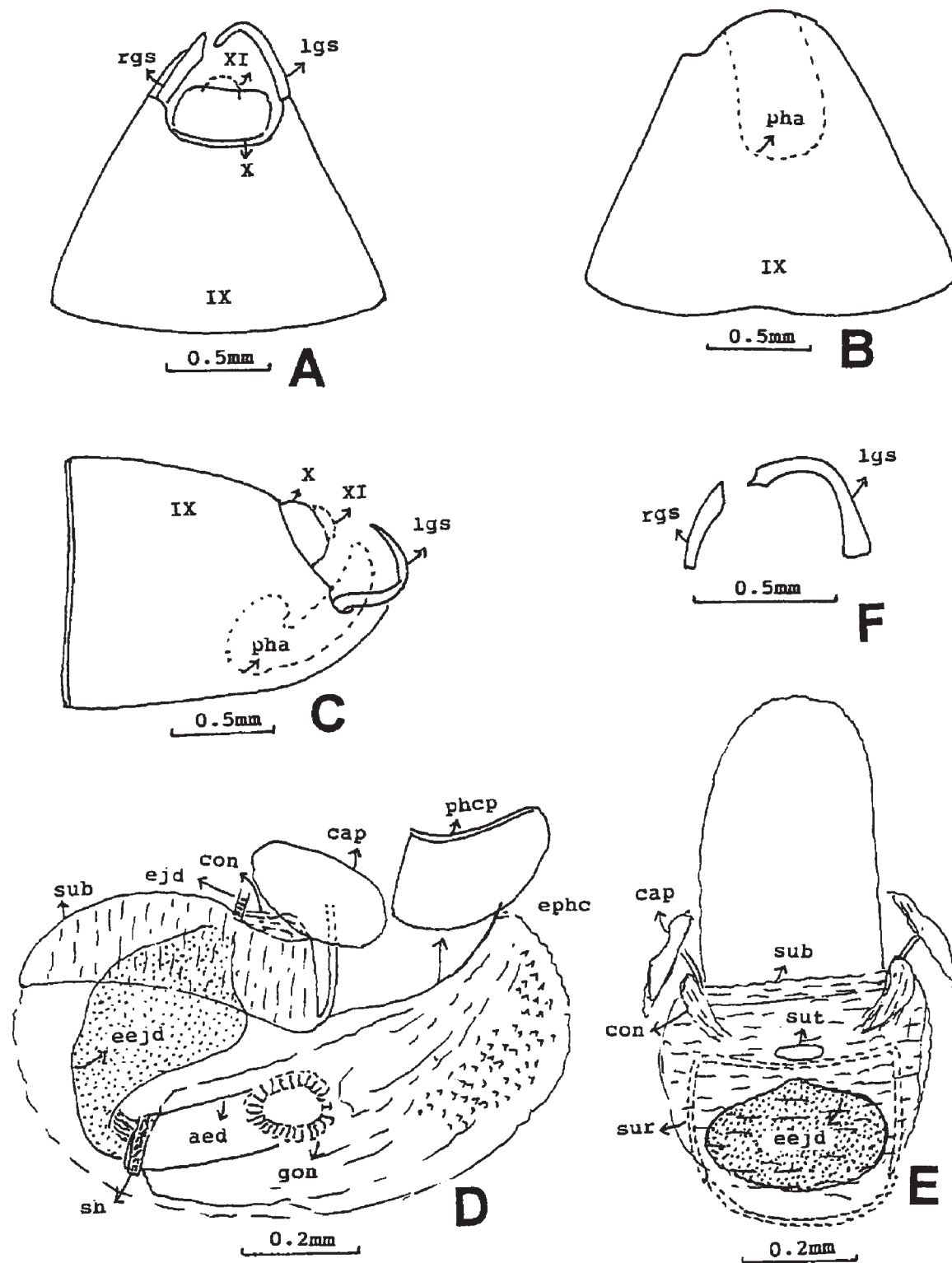


Fig. 112. *Lygus clypealis*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. phallus, lateral view; E. the same, dorsal view; F. genital styles, dorsal view.

113. *Tingnotum* sp.

Fig. 113

Apex of abdominal tergite IX 0.47 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, right 2/3 roundly produced caudad. Abdominal segment X transverse. Abdominal segment XI retracted into segment X. Genital plates arched, both ends somewhat expanded. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes comparatively large. Support tube not upraised. Support ring subquadrate. Expanded ejaculatory duct not separated into 2 parts, basal 2/3 subquadrate, broad, apical 1/3 narrow, not spiraled. Sheath short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one more than 1/2 width of phallobase. Exposed phallobasal conjunctiva bulbous. Aedeagus shortened, subparallel-sided. Gonopore defined, with transverse ridges, wedge-shaped, directed to left and lateroventrad.

Specimen examined: 1 male. Taiwan: Nantou Co., Huisun. 20 Feb. 1990. C. S. Tseng. NMNS ENT 629-7035. Det. by C. S. Lin.

(19) Tribe Stenodromini114. *Trigonotylus tenuis* Reuter, 1893

Fig. 114

Left laterocaudal portion of abdominal segment IX with a rather-long process. Apex of abdominal tergite IX 0.71 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, acutely pointed at apex, left laterocaudal margin somewhat concave in dorsal view, [after/beyond?] genital plates with a transverse ridge as figured. Abdominal segment X elongate in lateral view, extremely broad in dorsal view. Abdominal segment XI not retracted into segment X. Genital plates arched, both ends expanded. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed. Capitae processes moderately large. Support tube not upraised. Sheath undifferentiated. Expanded ejaculatory

duct not separated into 2 parts, not spiraled. Phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one about 1/4 of phallobase. Exposed phallobasal conjunctiva bulbous, with a long, pigmented process. Aedeagus shortened, parallel-sided, slightly converging to apex. Gonopore defined, with transverse ridges, elongate ovate, directed to left and lateroventrad.

Specimen examined: 1 male. Taiwan: Hualien Co., 9 Aug. 1989. K.W. Huang. NMNS ENT 465-1911. Det. By C. S. Lin.

115. *Stenodema brevinotum* Lin, 1998

Fig. 115

Left laterocaudal portion of abdominal segment IX with a short process. Apex of abdominal tergite IX 0.66 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, left laterocaudal margin oblique, apex acutely produced. Abdominal segment X elongate in lateral view, quadrate in dorsal view. Abdominal segment XI retracted into segment X. Genital plates arched, both ends expanded. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, transverse portion roundly produced ventrad. Support bridge poorly developed, with rather-long area beyond end of connective in lateral view. Capitae processes moderately large. Support tube not upraised. Expanded ejaculatory duct not separated into 2 parts, slender, lightly pigmented, not spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one about 1/4 of phallobase. Exposed phallobasal conjunctiva bulbous, with a pigmented process at basoventral portion. Aedeagus shortened, parallel-sided. Gonopore defined, with transverse ridges, ovate, directed to left.

Specimen examined: 1 male. Taiwan: Ilan, Tsuifenghu. 4 Aug. 1992. W. T. Yang. 1436-30. Det. by C. S. Lin.

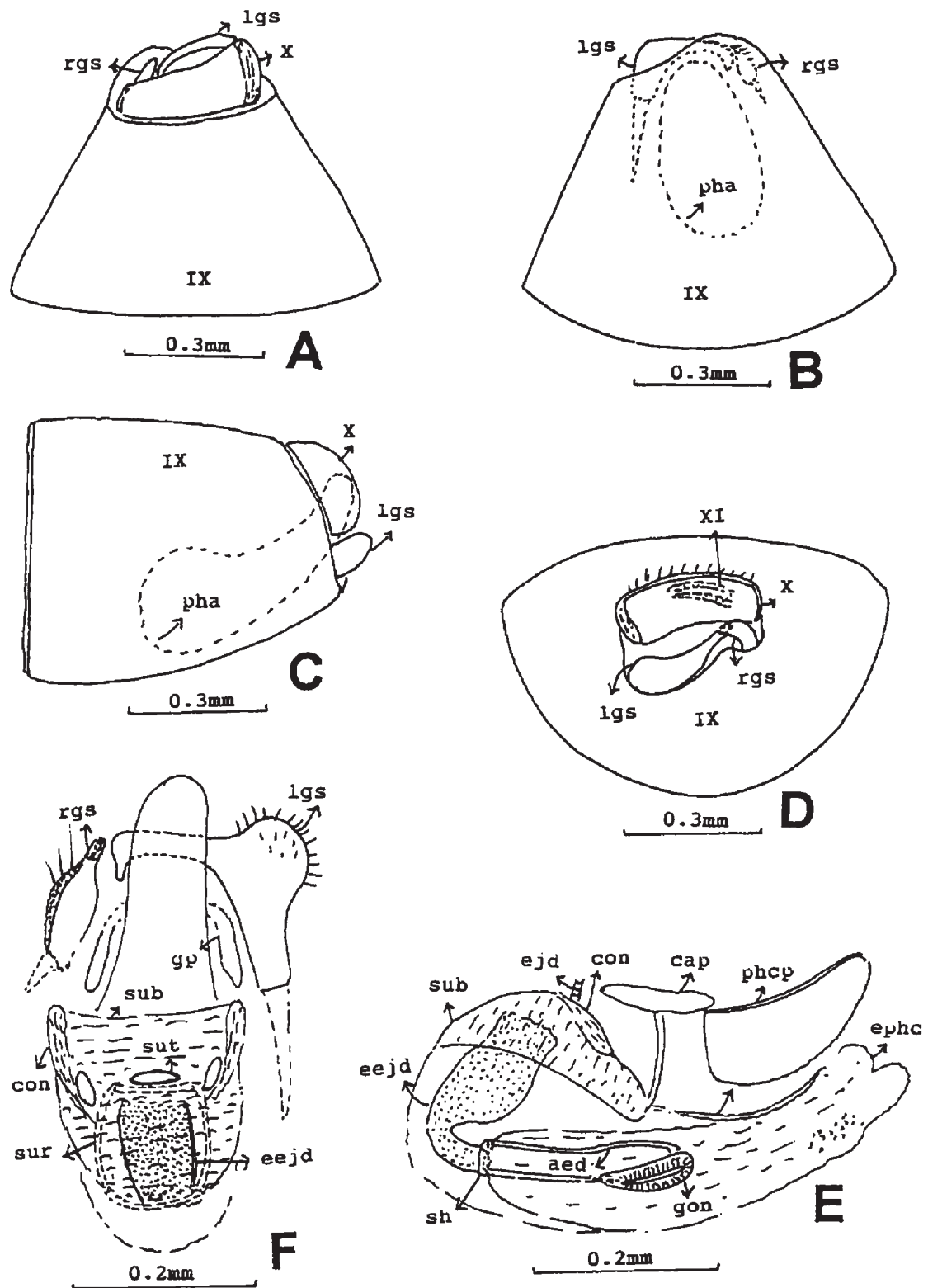


Fig. 113. *Tinginotum* sp. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. phallus and genital styles, dorsal view.

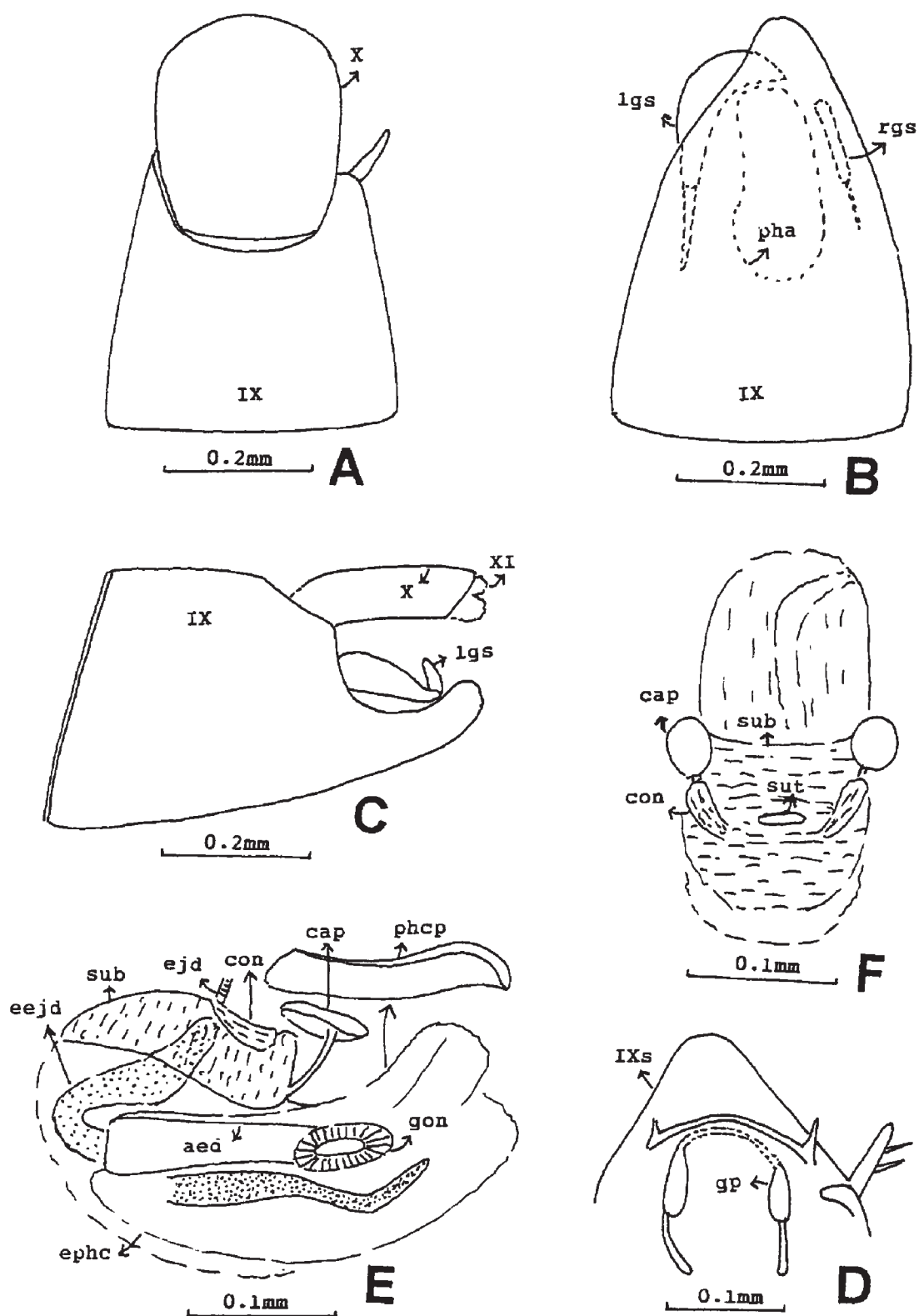


Fig. 114. *Trigonotylus tenuis*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. apex of abdominal sternite IX and genital plates, dorsal view; E. phallus, lateral view; F. the same, dorsal view.

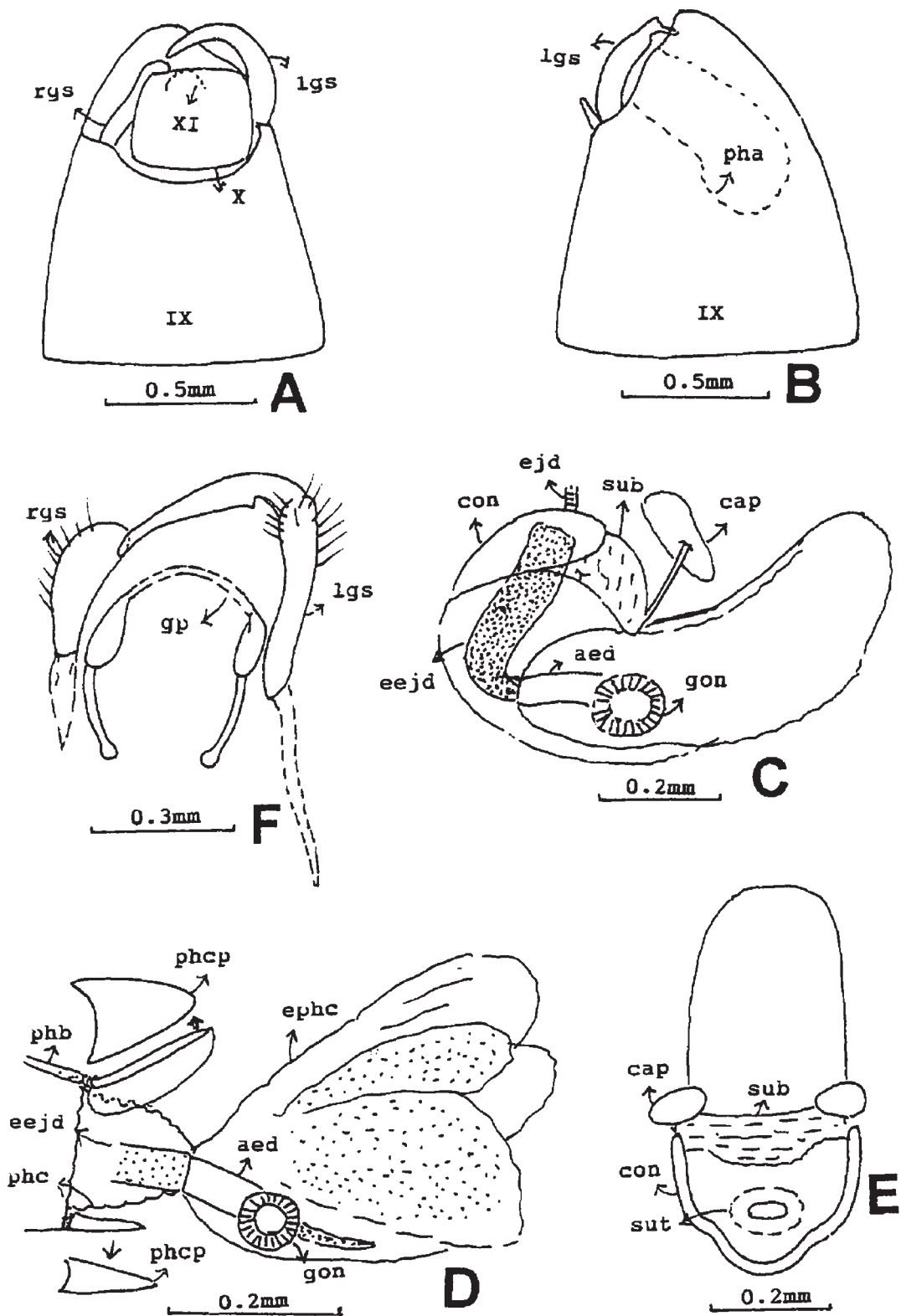


Fig. 115. *Stenodema brevinotum*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. phallus, lateral view; D. aedeagus in complete eversion, lateral view; E. phallus, dorsal view; F. genital plates and genital styles, dorsal view.

116. *Stenodema longicollis* Poppius, 1915

Fig. 116

Left laterocaudal portion of abdominal segment IX with a stout process. Apex of abdominal tergite IX 0.66 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, left laterocaudal margin oblique, apex acutely produced caudad. Abdominal segment X elongate in lateral view; quadrate in dorsal view. Abdominal segment XI not retracted into segment X. Genital plates not examined. Genital styles asymmetrical, one on left larger.

Connective complete, U-shaped. Support bridge poorly developed, very narrow below connective in lateral view. Capitae processes moderately large. Support tube somewhat upraised. Expanded ejaculatory duct not separated into 2 parts, caudal margin heavily pigmented, basal 2/3 expanded medially, apical 1/3 narrow, not spiraled. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, width of base of dorsal one about 1/4 of phallobase. Exposed phallobasal conjunctiva bulbous, with 2 pigmented processes. Aedeagus shortened, parallel-sided. Gonopore defined, elongate ovate, directed to left.

Specimen examined: 1 male. Taiwan: Hualien, Wanjung. 2 Feb. 1992. C. T. Lee. NMNS ENT 1403-627. Det. by C. S. Lin.

117. *Dolichomiris antennatis* (Distant, 1904)

Fig. 117

Left laterocaudal portion of abdominal segment IX with a small process. Apex of abdominal tergite IX 0.67 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, right submedian portion acutely produced caudad. Abdominal segment X elongate in lateral view; subquadrate in dorsal view. Abdominal segment XI not retracted into segment X. Genital plates arched, both ends expanded. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge poorly developed, below connective with rather-large triangular area in lateral view. Capitae processes moderately large. Support tube somewhat upraised. Expanded ejaculatory duct not separated into 2 parts, slender, not spiraled. Both

phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, dorsal one rod-like. Exposed phallobasal conjunctiva bulbous, with 2 stout pigmented processes. Aedeagus shortened, parallel-side. Gonopore defined, with transverse ridges, elongate ovate, directed to left and laterodorsad.

Specimen examined: 1 male. Taiwan: Nantou, Meifeng. 13~14 Sept. 1997. C. S. Lin. and W. T. Yang. Det. by C. S. Lin.

118. *Dolichomiris linearis* Reuter, 1882

Fig. 118

Apex of abdominal tergite IX 0.66 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, median portion acutely produced caudad. Abdominal segment X elongate in lateral view; before middle angulated in dorsal view. Abdominal segment XI not retracted into segment X. Genital plates arched, both ends expanded. Genital styles asymmetrical in shape and size, one on left slightly larger.

Connective complete, U-shaped. Support bridge poorly developed, below connective a large triangle in lateral view. Capitae processes small. Support tube somewhat upraised. Expanded ejaculatory duct not separated into 2 parts, slender, lightly pigmented, not spiraled. Sheath short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctiva processes exposed in genital chamber, dorsal one rod-like. Exposed phallobasal conjunctiva bulbous. Aedeagus shortened, ventral margin roundly produced ventrad. Gonopore defined, with transverse extremely large ridges, wedge-shaped, directed dorsad.

Specimen examined: 1 male. Taiwan: Nantou. 25~26 Jan. 1995. W. T. Yang. Det. by C. S. Lin.

119. *Lasiomiris purpurascens* Zheng, 1986

Fig. 119

Apex of abdominal tergite IX 0.50 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, left submedian portion roundly produced caudad. Abdominal segment X elongate in lateral view. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective complete, U-shaped. Support bridge poorly developed, rather narrow in lateral view. Capitae processes moderately large. Support tube rather upraised. Expanded ejaculatory duct not separated into 2 parts, slender, not spiraled. Sheath quadrate. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, dorsal one expanded subapically. Exposed phallobasal conjunctiva bulbous, with 2 processes. Aedeagus shortened, subparallel-sided. Gonopore defined, with transverse ridges, sharply wedge-shaped, directed dorsad.

Specimen examined: 1 male. Taiwan: Ilan.] 26~28 July 1983. L. T. Chou. Det. by C. S. Lin.

(20) Tribe *Mecistoscellini*

120. *Mecistoscelis scirtetoides* Reuter, 1891
Fig. 120

Apex of abdominal tergite IX 0.91 times width of widest portion; apical margin shallowly emarginated. Sternite with asymmetrical apex, roundly produced caudad. Abdominal segment X elongate in lateral view; elongate quadrate in dorsal view. Abdominal segment XI not retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed, caudal end produced dorsad in lateral view. Capitae processes moderately large. Support tube not upraised. Expanded ejaculatory duct not separated into 2 parts, lightly pigmented, not spiraled. Sheath undifferentiated. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber, dorsal one rod-like. Exposed phallobasal conjunctiva bulbous, with 2 pigmented processes. Aedeagus shortened, subparallel-sided in lateral view. Gonopore defined, with transverse ridges, elongate ovate, directed ventrad.

Specimen examined: 1 male. Taiwan: Nantou, Wushe. 30 Aug.~2 Sept. 1982. L. Y. Chou and K.C. Chou. Det. by C. S. Lin.

121. *Mystilus priamus* Distant, 1904
Fig. 121

Apex of abdominal tergite IX 0.68 times width of widest portion; apical margin shallowly

emarginated. Sternite with asymmetrical apex, right 1/2 roundly produced caudad. Abdominal segment X elongate in lateral view. Abdominal segment XI retracted into segment X. Genital plates not examined. Genital styles asymmetrical in shape and size, one on left larger.

Connective with reduced transverse portion. Support bridge well developed, caudal end produced dorsad in lateral view. Capitae processes small. Support tube not upraised. Support ring ring-like in dorsal view. Expanded ejaculatory duct not separated into 2 parts, lightly pigmented, not spiraled. Sheath short. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber unrecognizable, judged to be reduced. Exposed phallobasal conjunctiva bulbous. Aedeagus shortened, slightly diverging to apex. Gonopore defined, with transverse ridges, ovate, directed to left.

Specimen examined: 1 male. China: Yunnan Prov. 22 June 1979. Det. by L. Y. Zheng.

Remarks on Description of the *Mirinae*

Abdominal segment IX with completely fused tergite and sternite; not dorsoventrally elongate, quadrate in lateral view; its posterior opening not directed ventrocaudad; its anterior margin with undifferentiated extension; its surface either with or without a process. Abdominal segment X either transverse or elongate; directed either caudad or to right and laterocaudad; situated after abdominal tergite IX. Genital styles asymmetrical in shape and in size, one on left larger.

Connective either complete or with reduced transverse portion. Support bridge either poorly or well developed, if winged, either directed cephalad or not. Capitae processes differentiated. Expanded ejaculatory duct either separated into 2 parts; basal part variable in form, not spiraled; apical part spiraled; or not separated into 2 parts, not spiraled. Sheath either undifferentiated or differentiated. Both phallobase and phallobasal conjunctiva shortened. Phallobasal conjunctival processes exposed in genital chamber differentiated. Exposed phallobasal conjunctiva differentiated. Aedeagus difficult to distinguish in this taxon; here judged to be shortened. Gonopore defined, with transverse ridges.

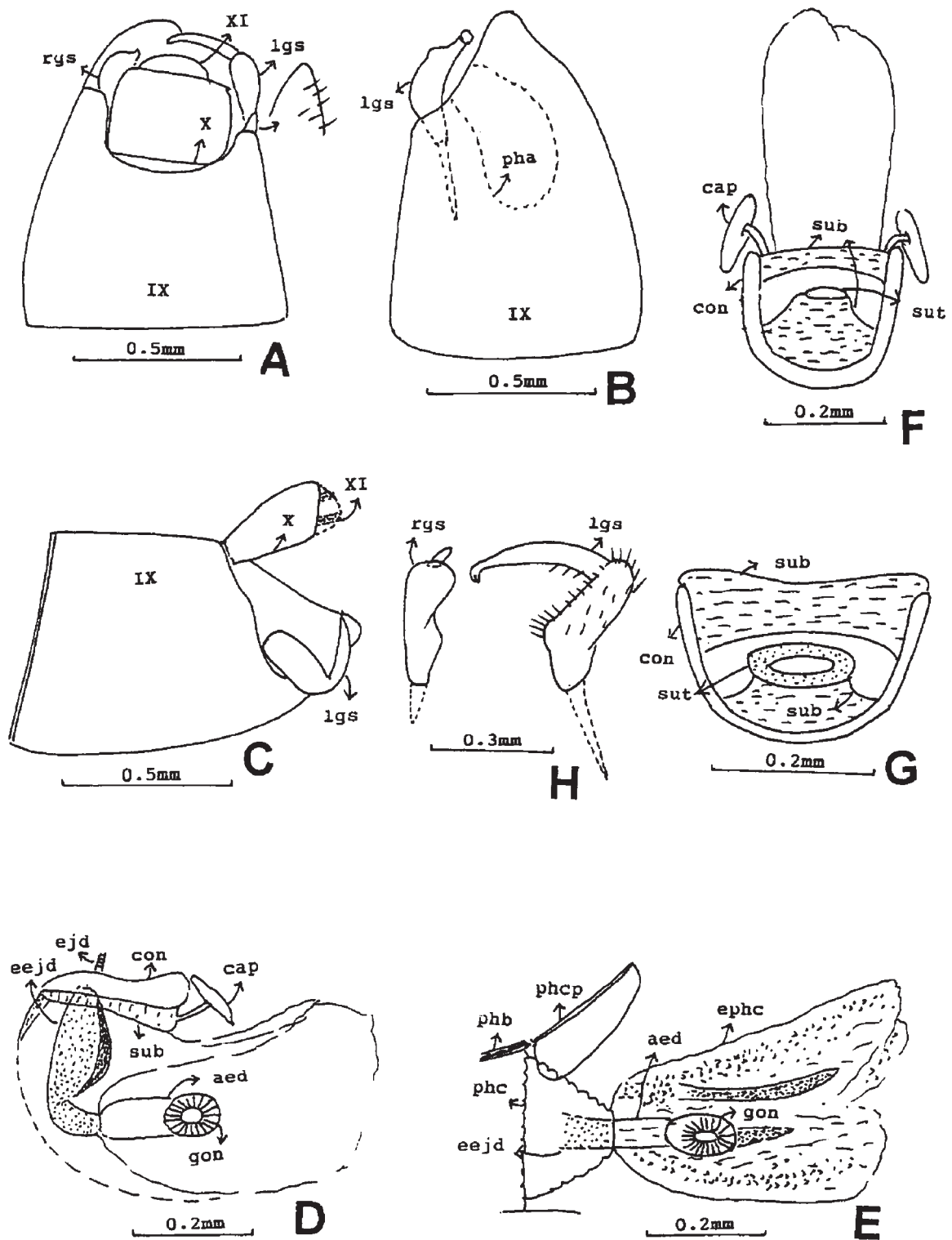


Fig. 116. *Stenodema longicollis*. A Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. phallus, lateral view; E. aedeagus in complete eversion, lateral view; F. phallus, dorsal view; G. connective, support bridge and support tube, dorsal view; H. genital styles, dorsal view.

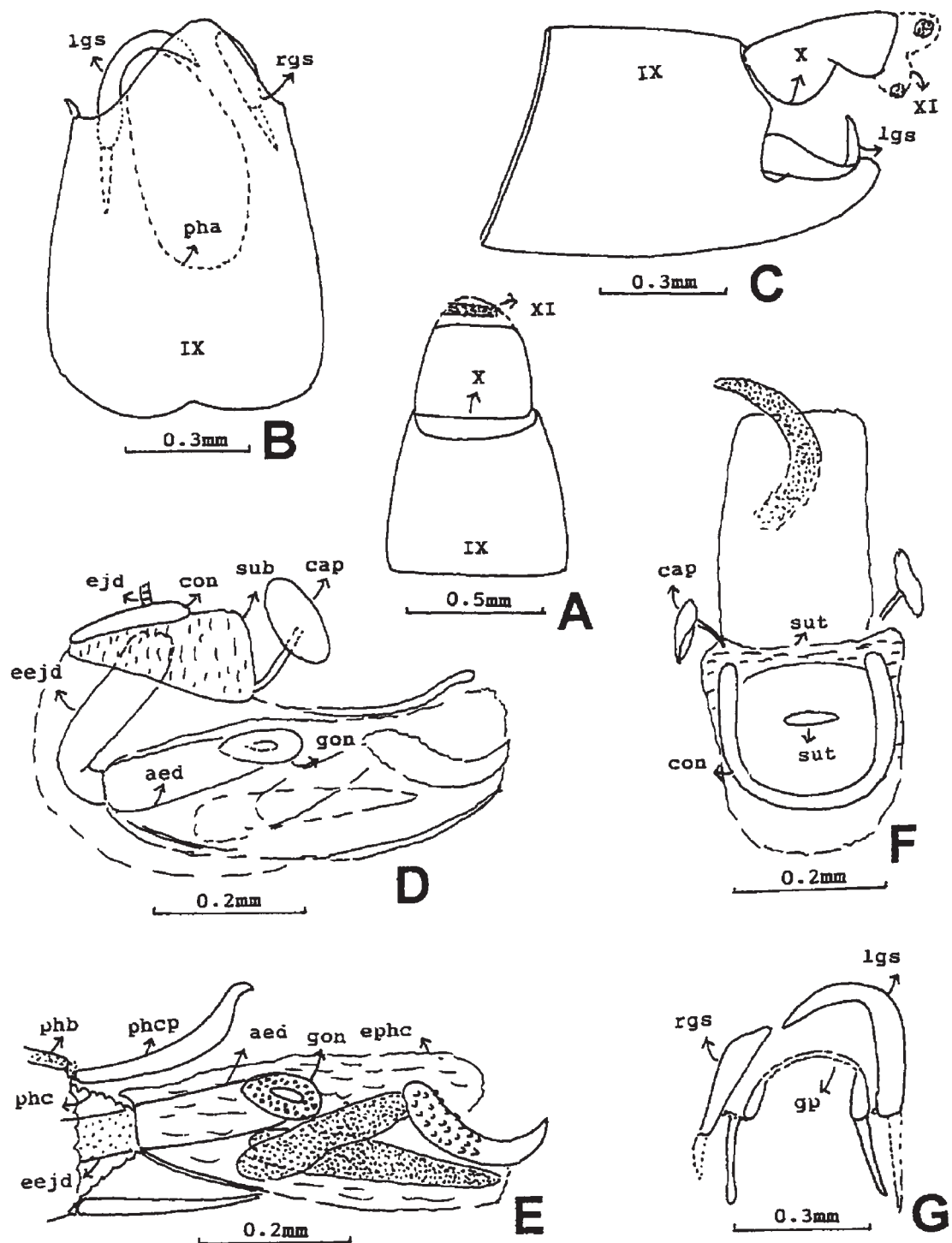


Fig. 117. *Dolichomiris antennatis*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. phallus, lateral view; E. aedeagus in complete eversion, lateral view; F. phallus, dorsal view; G. genital plates and genital styles, dorsal view.

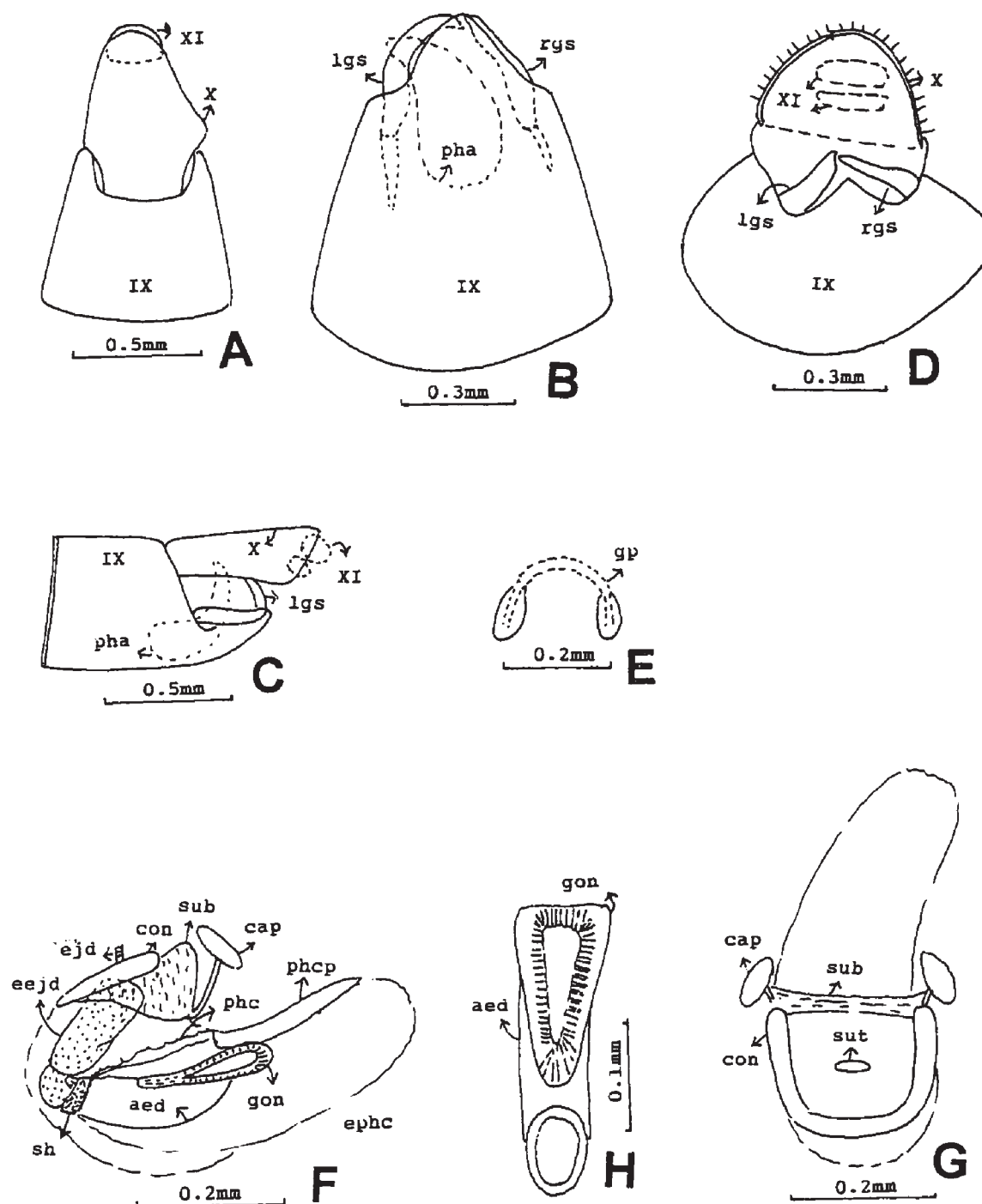


Fig. 118. *Dolichomiris linearis*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudoventral view; E. genital plates, dorsal view; F. phallus, lateral view; G. the same, dorsal view; H. aedeagus, dorsal view.

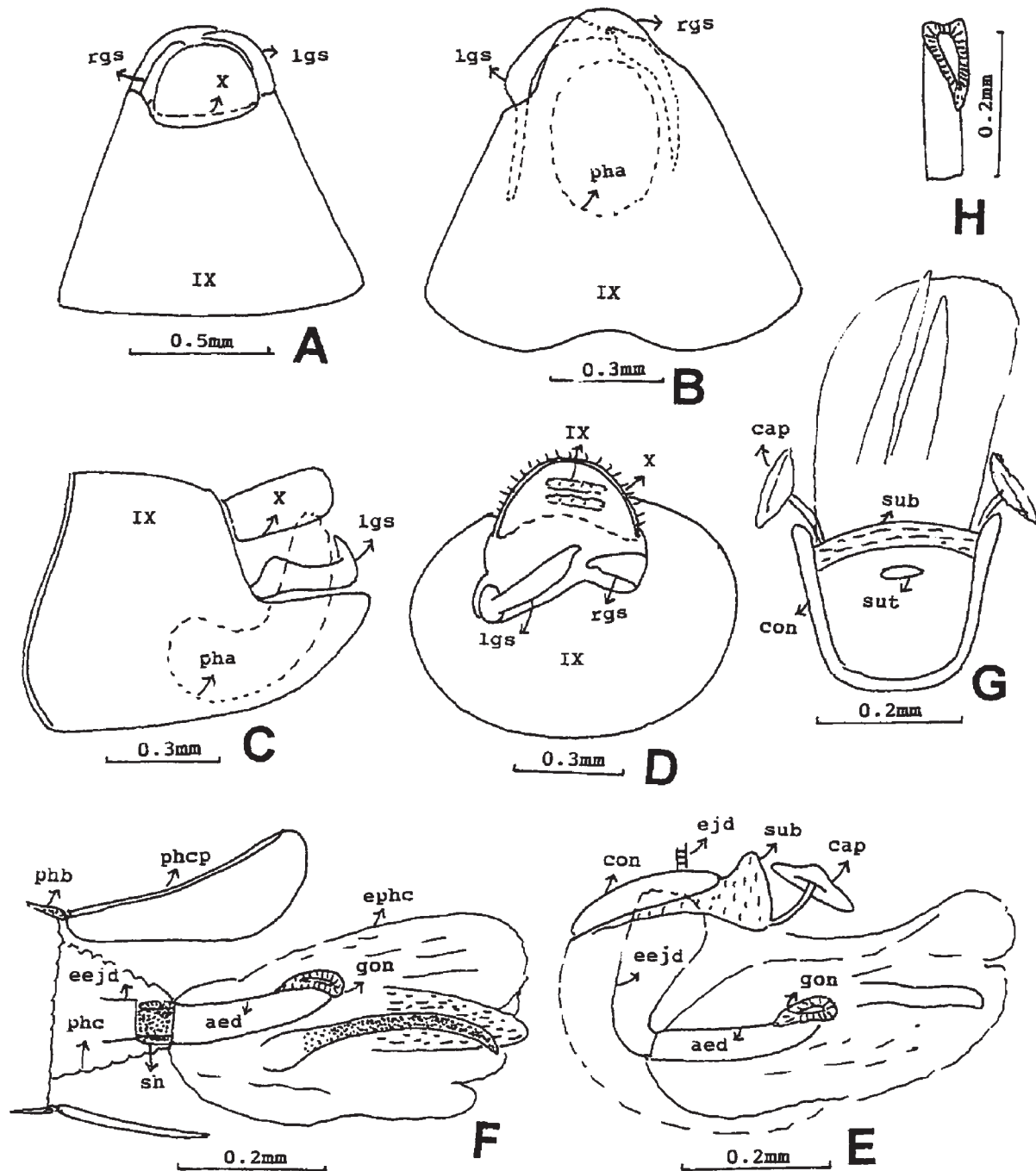


Fig. 119. *Lasiomiris purpurascens*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. aedeagus in complete eversion, lateral view; G. phallus, dorsal view; H. aedeagus, dorsal view.

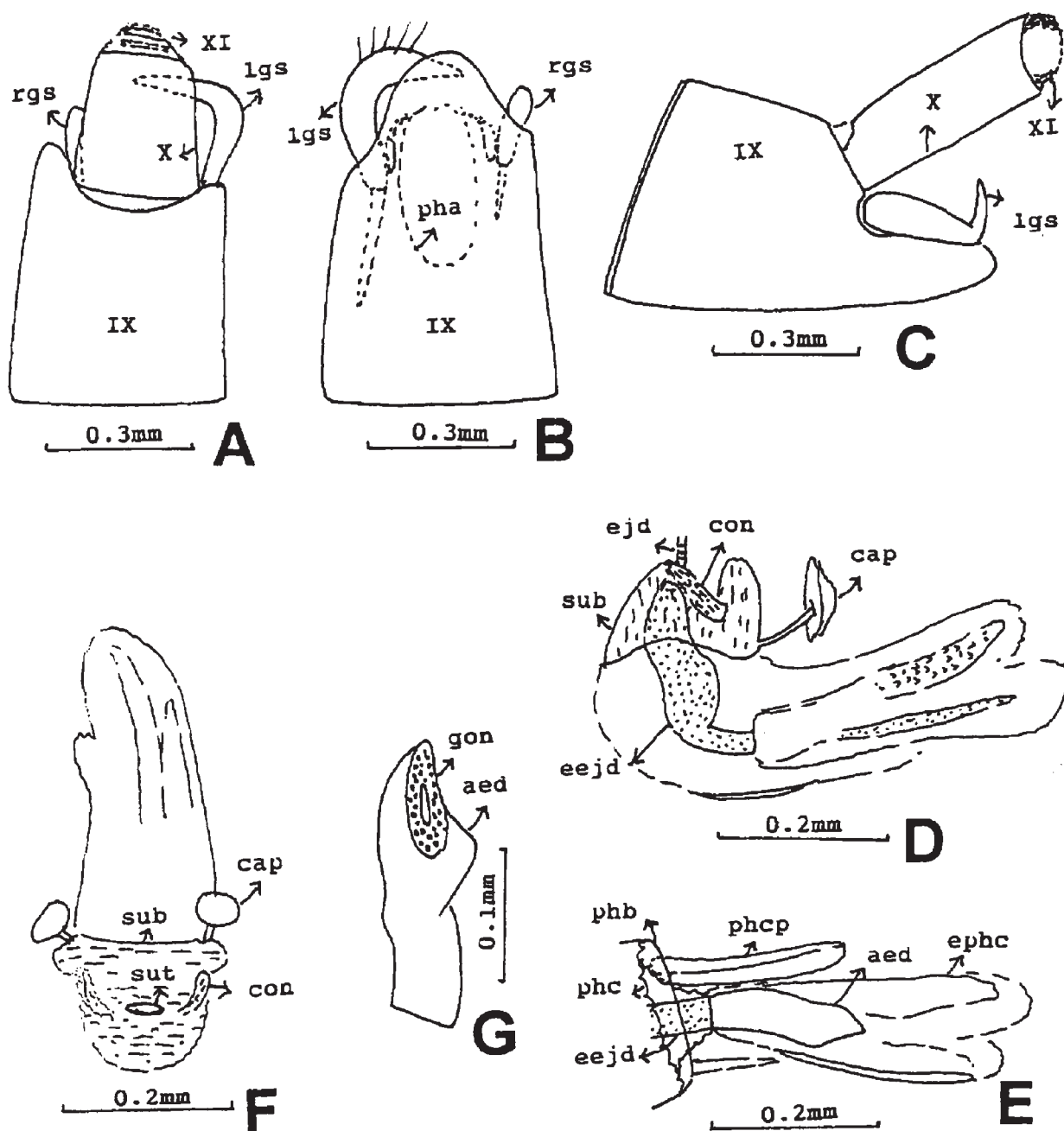


Fig. 120. *Mecistoscelis scirtetoides*. A. Abdominal segments IX~XI and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. phallus, lateral view; E. aedeagus in complete eversion, lateral view; F. phallus, dorsal view; G. aedeagus, ventral view.

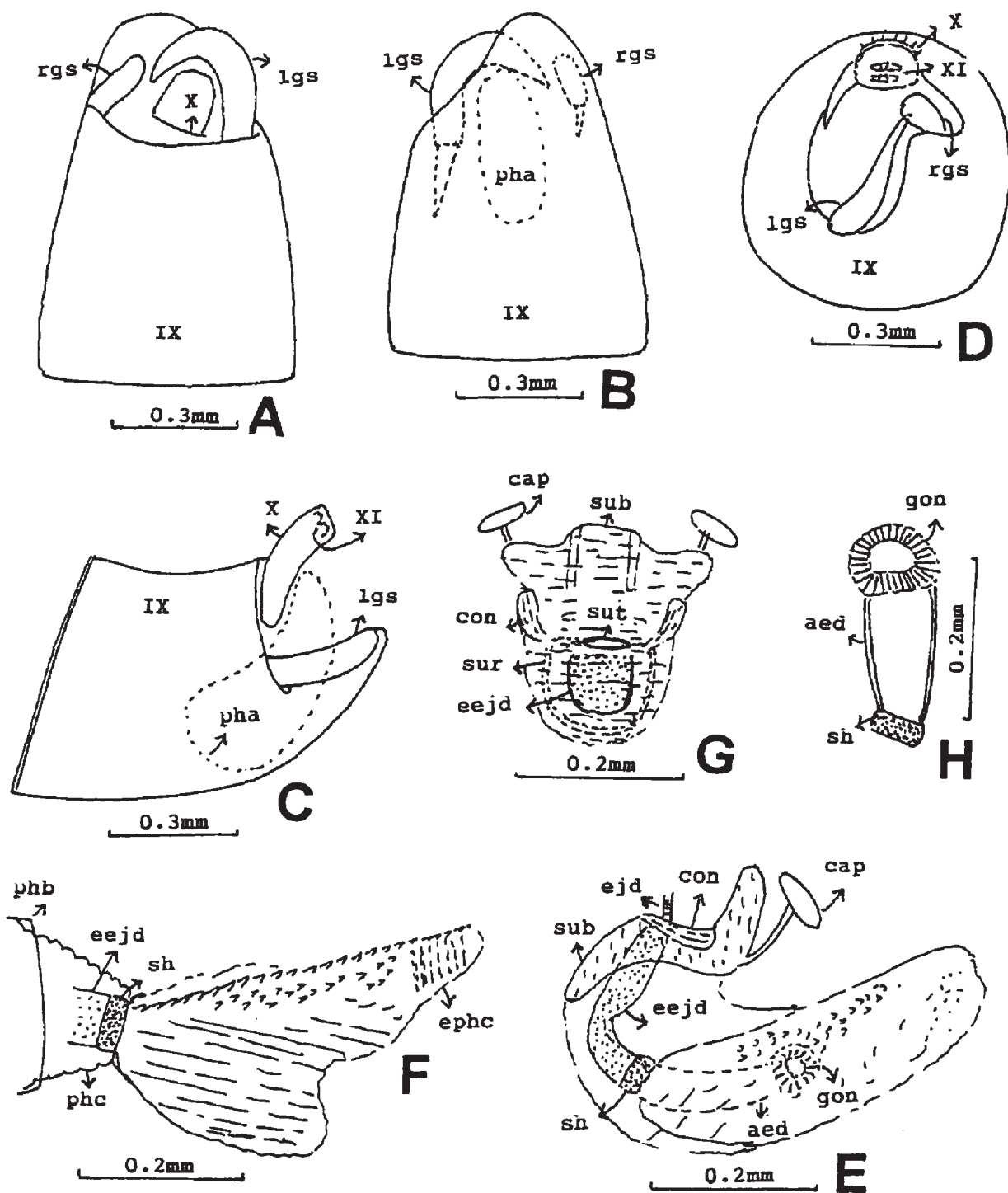


Fig. 121. *Mystilus priamus*. A. Abdominal segments IX and X and genital styles, dorsal view; B. the same, ventral view; C. the same, lateral view; D. the same, caudal view; E. phallus, lateral view; F. phallobasal conjunctiva in complete eversion, lateral view; G. connective, support bridge and support tube, dorsal view; H. aedeagus and sheath, dorsal view.

Information on phylogenetic relationships

Character analysis, codes, and state definitions

1. Special judgments in the subfamily

- (1) As for the connective, there are similar evolutionary lines i.e., i) complete or ii) transverse portion reduced in the Isometopinae, Orthotylinae, and Bryocorinae groups.
- (2) As for the gonopore, there are similar evolutionary lines i.e., i) difficult to recognize, ii) defined, iii) defined, with transverse ridges, or iv) wholly reduced in the Isometopinae, Orthotylinae, and Bryocorinae groups.
- (3) As for the sheath, there are similar evolutionary lines i.e., i) undifferentiated or ii) differentiated in the Isometopinae, Orthotylinae, and Bryocorinae groups.
- (4) As for the aedeagus, there are similar evolutionary lines i.e., i) moderately long, ii) lengthened, iii) shortened, or iv) wholly reduced in the Isometopinae, Orthotylinae, and Bryocorinae groups.

Based on the above data we judged that there are three evolutionary lines in the Miridae i.e., the Isometopinae group (Isometopinae, Psallopinae, and Cylapinae), Orthotylinae group (Orthotylinae and Phylinae), and Bryocorinae group (Bryocorinae, Deraeocorinae, and Mirinae).

This is a branching transformation series.

- 1*) 0 Orthotylinae and Bryocorinae evolutionary lines.
 - 1 Isometopinae evolutionary line (1~13**).
- 2) 0 Isometopinae and Bryocorinae evolutionary lines.
 - 1 Orthotylinae evolutionary line (14~51).
- 3) 0 Isometopinae and Orthotylinae evolutionary lines.
 - 1 Bryocorinae evolutionary line (52~121).

2. Special judgments in the relationships of some subfamilies.

"Paraphyletic: Pertaining to a monophyletic group that does not contain all the descendants (derivatives) of that group." (Mayr and Ashlock, 1991: 424).

"Ex-group: A group descended from a monophyletic group (traditionally defined) which renders that group paraphyletic." (Mayr and Ashlock, 1991: 415).

The exposed phallobasal conjunctiva appears in part of the Isometopinae i.e., *Isometopus* spp., the Psallopinae, and Cylapinae. These three subfamilies agree with the above definitions, so Isometopinae is paraphyletic, and Psallopinae and Cylapinae are the ex-groups.

The exposed phallobasal conjunctiva appears in part of the Bryocorinae i.e., *Felisacus* spp., and the Deraeocorinae and Mirinae. These three subfamilies agree with the above definitions.

The Bryocorinae is paraphyletic, and the Deraeocorinae and Mirinae are ex-groups.

- 4) 0 Exposed phallobasal conjunctiva (ephc) does not indicate paraphyletic and ex-group relationships; or indicates these relationships in the Bryocorinae group.
 - 1 Ephc indicates paraphyletic and ex-group relationships in regard to the Isometopinae (1~13).
- 5) 0 Ephc does not indicate paraphyletic and ex-group relationships; or indicates these relationships in the Isometopinae group.
 - 1 Ephc indicates paraphyletic and ex-group relationships in regard to the Bryocorinae (52~121).

3. Special judgment of the exposed phallobasal conjunctiva (ephc) within tribes of the Orthotylinae

In the Halticini if the ephc is differentiated, its phallobase and the phallobasal conjunctiva are not shortened, and the phallobasal conjunctival processes exposed in the genital chamber are undifferentiated.

In the Orthotylini, if the ephc is differentiated, its phallobase and the phallobasal conjunctiva are shortened, and the phallobasal conjunctival processes exposed in the genital chamber are differentiated.

Based on the above data, we judged these to be two evolutionary events. This is a branching transformation series.

- 6) 0 Ephc: undifferentiated, or if differentiated within the Orthotylinae group with shortened phallobase and phallobasal conjunctiva, and phallobasal conjunctival processes exposed in genital chamber differentiated; or undifferentiated or differentiated in the Isometopinae and Bryocorinae groups.
 - 1 Ephc: undifferentiated, or if differentiated within the Orthotylinae group, with neither phallobase nor phallobasal conjunctiva shortened, and phallobasal conjunctival

* Character number.

** Insect number.

processes in genital chamber undifferentiated (14~19).

- 7) 0 Ephc: undifferentiated, or if differentiated within the Orthotylinae group, with neither phallobase nor phallobasal conjunctiva shortened, and phallobasal conjunctival processes exposed in genital chamber undifferentiated; or undifferentiated or differentiated in the Isometopinae and Bryocorinae groups.
- 1 Ephc: undifferentiated or if differentiated within the Orthotylinae group, with phallobase and phallobasal conjunctiva shortened, and phallobasal conjunctival processes exposed in genital chamber differentiated (20~29).

4. Exposed phallobasal conjunctiva (ephc)

The distribution of the exposed phallobasal conjunctiva in the Miridae suggests that at least four evolutionary events have occurred.

The first event occurred within the Isometopinae in the Isometopini; the second event occurred within the Orthotylinae in the Halticini; the third event occurred within the Orthotylinae in the Orthotylini; and the fourth event occurred in the Bryocorinae in the Dicyphini: *Felisacus okinavanus*.

The evolution of the exposed phallobasal conjunctiva was judged to be a branching transformation series. Each transformation respectively differentiated from its undifferentiated member.

- 8) 0 Ephc undifferentiated in the Isometopinae; or undifferentiated or differentiated in the Orthotylinae and Bryocorina groups.
- 1 Ephc: differentiated in the Isometopinae group (5, 6, 8~13).
- 9) 0 Ephc undifferentiated in the Orthotylinae (Halticini); or undifferentiated or differentiated in the Isometopinae group and the Orthotylinae (Orthotylini, Phylinae, and Bryocorinae groups).
- 1 Ephc differentiated within the Orthotylinae (Halticini) (15~19).
- 10) 0 Ephc undifferentiated in the Orthotylinae (Orthotylini); or undifferentiated or differentiated in the Isometopinae group, Orthotylinae: Halticini, Phylinae-, Bryocorinae-group.
- 1 Ephc differentiated within the Orthotylinae (Orthotylini) (23~30).
- 11) 0 Ephc undifferentiated within the

Bryocorinae; or undifferentiated or differentiated in the Isometopinae and Orthotylinae groups.

- 1 Ephc differentiated within the Bryocorinae (59~65, 67, 72~121).

5. Expanded ejaculatory duct (eejd).

The expanded ejaculatory duct was found in all 121 examined species of Miridae and is present only in the Miridae. If this record is correct, then this character is a synapomorphy of the Miridae. The evolutionary event occurred in an ancestor of the Miridae.

There are four character states recognized in the transformation series: not separated into two parts, the same width, and spiraled throughout its length were determined to be plesiomorphic based on their being the least modified compared with other the states. It is a linear transformation series.

- 12) 0 Eejd undifferentiated (other Heteroptera).

- 1 Eejd differentiated, (1) not separated into 2 parts, same width and spiraled throughout its length (5, 6);
- or (2) separated into 2 parts, basal part rounded, either spiraled or not, apical part slender, spiraled (1-4, 7);
- or (3) separated into 2 parts, basal part variable in form, not spiraled, apical part spiraled (8-13, 15-19, 22-29, 42, 49, 50, 52-58, 59-65, 66, 67, 72, -73, 75-79, 80-103);
- or (4) not separated into 2 parts, not spiraled (14, 20, 21, 30-41, 43-48, 51, 68-71, 74, 104-121).

- 13) 0 Eejd undifferentiated (other Heteroptera); or differentiated, (1) separated into 2 parts, same width and spiraled throughout its length.

- 1 Eejd differentiated, (2) separated into 2 parts, basal part rounded, either spiraled or not, apical part slender, spiraled (1-4, 7);
- or (3) separated into 2 parts, basal part variable in form, not spiraled, apical part spiraled (8-13, 15-19, 22-29, 42, 49-50, 52-58, 59-65, 66-67, 72-73, 75-79, 80-103);
- or (4) not separated into 2 parts, not spiraled (14, 20, 21, 30-41, 43-48, 51, 68-71, 74, 104-121).

- 14) 0 Eejd undifferentiated (other Heteroptera); or differentiated, (1) not separated into 2 parts, same width and spiraled throughout its length;

or (2) separated into 2 parts, basal part rounded, either spiraled or not, apical part slender, spiraled.

- 1 Eejd differentiated, (3) separated into 2 parts, basal part variable in form, not spiraled, apical part spiraled (8-13, 15-19, 22-29, 42, 49, 50, 52-65, 66, 67, 72, 73, 75-79, 80-103);
- or (4) not separated into 2 parts, not spiraled (14, 20, 21, 30-41, 43-48, 51, 68-71, 74, 104-121).
- 15) 0 Eejd undifferentiated (other Heteroptera);
- or differentiated, (1) not separated into 2 parts, same width and spiraled throughout its length;
- or (2) separated into 2 parts, basal part rounded, either spiraled or not, apical part slender, spiraled;
- or (3) separated into 2 parts, basal part variable in form, not spiraled, apical part spiraled.
- 1 Eejd differentiated, (4) not separated into 2 parts, not spiraled (14, 20, 21, 30-41, 43-48, 51, 68-71, 74, 104-121).

6. Tarsus segmentation

According to Schuh and Slater (1996: 172) tarsi are two-segmented in the Isometopinae and Psallopinae; two- or three-segmented in the Cylapinae; and three-segmented in the Orthotylinae, Phylinae, Bryocorinae, Deraeocorinae, and Mirinae. The two-segmented tarsus is judged to be plesiomorphic. It is a linear transformation series.

- 16) 0 Tarsus 2- or 2~3-segmented.
- 1 Tarsus 3-segmented (14-121).

7. Subapical claw tooth

Schuh (1976: 8) considered that "The Isometopinae, Cylapinae, and Psallopinae have a subapical tooth on the claw (Figs. 7, 8, 37). The form and location of the tooth rather constant in all of those groups that possess it. The condition has been illustrated by Knight (1918), McAtee and Mallock (1924), and Carvalho (1955) and mentioned by Kelton (1959), although no one has commented on its taxonomic utility." Schuh himself also neglected its value.

If "The form and location of the tooth rather constant in all of those groups that possess it" is correct, then the subapical claw tooth agrees with the character having a high weight:

- 1) "Constance - A character that is constant

throughout large groups of species (Isometopinae, Psallopinae, and Cylapinae)."

- 2) "Consistency - A character that is consistently present in one group (Isometopinae, Psallopinae, and Cylapinae) not just consistently absent in related groups (the other subfamilies of Miridae)." (Mayr and Ashlock, 1991: 188).
- 17) 0 Subapical claw tooth undifferentiated.
- 1 Subapical claw tooth differentiated (1-13).

8. Phallobasal conjunctival processes (phcp) exposed in the genital chamber

The phallobasal conjunctival processes are usually situated near the base of both sides of the aedeagus. In the Miridae, beyond the apex of the phallobase of the dorsal and ventral plates is variable in form judging from the phallobasal conjunctival processes having been rotated and modified. This differentiated structure was judged to be apomorphic. It is a branching transformation series.

- 18) 0 Phcp exposed in genital chamber undifferentiated; or differentiated, dorsal one larger.
- 1 Phcp exposed in genital chamber differentiated, ventral one larger, plate-shaped (22-25); or tube-shaped (26-29).
- 19) 0 Phcp exposed in genital chamber undifferentiated; or differentiated, dorsal one larger; or ventral one larger, plate-shaped.
- 1 Phcp exposed in genital chamber differentiated, ventral one larger, tube-shaped (26-29).
- 20) 0 Phcp exposed in genital chamber undifferentiated; or differentiated, ventral one larger.
- 1 Phcp exposed in genital chamber differentiated, dorsal one larger (59-65, 67, 72-121).

9. Abdominal tergite IX and sternite IX incompletely fused

The abdominal tergite IX and sternite IX are incompletely fused in the Isometopinae (Isometopini). They are completely fused in the Isometopinae (Dilphlebini) (Konstantinov, 2003: 27) and other subfamilies. This incompletely fused state was judged to be a reversal.

- 21) 0 Abdominal tergite X and sternite IX completely fused.
- 1 Abdominal tergite IX and sternite IX incompletely fused (1-6).

10. Form of abdominal segment IX

The tergite of abdominal segment IX is normally shorter than the sternite in lateral view in the Heteroptera. In the Bryocorinae (Bryocorini) it is modified into dorsoventrally elongate quadrate form which is typical of the Fulgoroidea.

The dorsoventral elongate quadrate state was judged to be apomorphic.

- 22) 0 Abdominal segment IX not dorsoventrally elongate quadrate in lateral view.
- 1 Abdominal segment IX dorsoventrally elongate quadrate in lateral view (68-71).

11. Direction of the posterior opening of IX

The direction of the posterior opening of abdominal segment IX in most species of the Miridae is dorsocaudad, sometimes caudad. It is difficult to clearly distinguish these two because of the intermediate. But the ventrocaudad direction can easily be directly observed in the Bryocorinae (Bryocorini) from the ventral view.

The posterior opening of the abdominal segment IX directed ventrocaudad was judged to be apomorphic.

- 23) 0 Posterior opening of IX not directed ventrocaudad.
- 1 Posterior opening of IX directed ventrocaudad (68-71).

12. Extension of IX

The extension of IX appearing in the Nepomorpha is exaggerated. In the Miridae it may be a useful character in the Bryocorinae (Dicyphini). It was judged to be apomorphic.

- 24) 0 Extension of IX undifferentiated.
- 1 Extension of IX differentiated (24, 55-65, 79).

13. Processes of IX

The process of the abdominal segment IX can be distinguished into three groups according to its position:

- 1) left lateral portion;
- 2) left apicolateral portion; and
- 3) ventral apical portion.

Judging from their positions, these three forms of the process of abdominal segment IX are likely not homologous structures. These structures may be useful at the generic or species level when more members are examined. This character was judged to be apomorphic. It is a branching transformation series.

- 25) 0 Process of IX undifferentiated; or

differentiated, not at left lateral portion;

- 1 Process of IX differentiated at left lateral portion (10, 23, 24, 29, 35).
- 26) 0 Process of IX undifferentiated; or differentiated, not at left apicolateral portion.
- 1 Process of IX differentiated at left apicolateral portion (85, 101-103, 115-117).
- 27) 0 Process of IX undifferentiated; or differentiated, not at ventral apical portion.
- 1 Process of IX differentiated at ventral apical portion (51, 64, 65).

14. Shape of abdominal segment X

The shape of abdominal segment X being elongate in lateral view was judged to be apomorphic.

- 28) 0 Shape of abdominal segment X transverse.
- 1 Shape of abdominal segment elongate (20-21, 28, 52-56, 59-60, 114-121).

15. Direction of abdominal segment X

Abdominal segment X directed to the left or right and laterocaudad was judged to be apomorphic. It is a branching transformation series.

- 29) 0 Abdominal segment X directed caudad; or directed to right and laterocaudad.
- 1 Abdominal segment X directed to left and laterocaudad (10, 22, 57, 58, 63).
- 30) 0 Abdominal segment X directed caudad; or directed to left and laterocaudad.
- 1 Abdominal segment X directed to right and laterocaudad (14, 75, 79, 104).

16. Position of abdominal segment X

Abdominal segment X is normally situated after abdominal IX. Abdominal segment X being situated below abdominal tergite IX was judged to be apomorphic.

- 31) 0 Abdominal segment X situated after abdominal tergite IX.
- 1 Abdominal segment X situated below abdominal tergite IX (61, 62, 64, 65, 68-71).

17. Connective (con)

The distribution of the transverse portion of the reduced connective in the Miridae indicates that this evolutionary event has occurred several times.

The transverse portion of the reduced connective was judged to be apomorphic. It is a branching transformation series.

- 32) 0 Con complete; or con with reduced

transverse portion in the Orthotylinae and Bryocorinae groups.

- 1 Con with transverse portion reduced in the Isometopinae group (10-11, 13).
- 33) 0 Con complete; or con with reduced transverse portion in the Isometopinae and Bryocorinae groups.
- 1 Con with reduced transverse portion in the Orthotylinae group (14-30, 32-34, 36-42, 43-45, 47-51).
- 34) 0 Con complete; or con with reduced transverse portion in the Isometopinae and Orthotylinae groups.
- 1 Con with reduced transverse portion in the Bryocorinae group (75-78, 80-113, 114, 120, 121).

18. Support bridge (sub)

The support bridge being winged and directed cephalad is only distributed in the Bryocorinae (Bryocorini). This character state was judged to be apomorphic.

- 35) 0 Sub not winged, directed cephalad.
- 1 Sub winged, directed cephalad (67-71, 85, 92).

19. Capitate processes (cap)

The capitate processes is differentiated in the Leptopodomorpha, Cimicomorpha, and Pentatomomorpha (Yang, 2004: 72). The wholly reduced state in the Bryocorinae (Bryocorini) was judged to be apomorphic.

- 36) 0 Cap present.
- 1 Cap reduced (68-71).

20. Shortened phallobase

The shortened phallobase state was judged to be apomorphic. It is a branching transformation series.

- 37) 0 Phallobase not shortened; or shortened in the Bryocorinae group.
- 1 Phallobase shortened in the Orthotylinae group (22-29).
- 38) 0 Phallobase not shortened; or shortened in the Orthotylinae group.
- 1 Phallobase shortened in the Bryocorinae group (59-65, 67, 72-121).

21. Phallobasal conjunctiva

The shortened phallobasal conjunctiva state was judged to be apomorphic. It is a branching transformation series.

- 39) 0 Phallobasal conjunctiva not shortened; or

shortened in the Bryocorinae group.

- 1 Phallobasal conjunctiva shortened in the Orthotylinae group (22-29).
- 40) 0 Phallobasal conjunctiva not shortened; or shortened in the Orthotylinae group.
- 1 Phallobasal conjunctiva shortened in the Bryocorinae group (59-65, 67, 72-121).

22. Gonopore (gon)

The gonopore being difficult to recognize was judged to be plesiomorphic; then defined; then defined with transverse ridges; then undefined with sclerotized ridges; then wholly reduced. It is a linear transformation series. The distribution of the gonopore in the Miridae indicates that it is a branching transformation series.

- 41) 0 Gon difficult to recognize in the Isometopinae group; or in the Orthotylinae and Bryocorinae groups.
- 1 Gon defined in the Isometopinae group (7); or defined with transverse ridges (8, 9); or wholly reduced (10-13).
- 42) 0 Gon difficult to recognize in the Isometopinae group; or defined; or in the Orthotylinae and Bryocorinae groups.
- 1 Gon defined, with transverse ridges in the Isometopinae group (8, 9); or wholly reduced (10-13).
- 43) 0 Gon difficult to recognize in the Isometopinae group; or defined, with transverse ridges in the Orthotylinae and Bryocorinae groups.
- 1 Gon wholly reduced in the Isometopinae group (10-13).
- 44) 0 Gon difficult to recognize in the Orthotylinae group; or in the Isometopinae and Bryocorinae groups.
- 1 Gon defined in the Orthotylinae group (33, 34, 46); or defined with transverse ridges (30, 32, 37-42, 45, 47-51); or undefined, with sclerotized ridges (15, 16); or wholly reduced (17-19).
- 45) 0 Gon difficult to recognize in the Orthotylinae group; or defined in the Isometopinae and Bryocorinae groups.
- 1 Gon defined, with transverse ridges in the Orthotylinae group (22, 32, 37-42, 45, 47-51); or undefined with sclerotized ridges (15, 16); or wholly reduced (17-19).
- 46) 0 Gon difficult to recognize in the Orthotylinae group; or defined; or defined, with transverse ridges in the Isometopinae and Bryocorinae groups.

- 1 Gon undefined, with sclerotized ridges in the Orthotylinae group (15, 16); or wholly reduced (17-19).
- 47) 0 Gon difficult to recognize in the Orthotylinae group; or defined; or defined, with transverse ridges; or undefined, with sclerotized ridges in the Isometopinae and Bryocorinae groups.
- 1 Gon wholly reduced in the Orthotylinae group (17-19).
- 48) 0 Gon difficult to recognize in the Bryocorinae group; or in the Isometopinae and Orthotylinae groups.
- 1 Gon defined in the Bryocorinae group (62); or defined with transverse ridges (67, 80-121); or undefined with sclerotized ridges (72, 73, 77, 78); or wholly reduced (54-58, 64, 65).
- 49) 0 Gon difficult to recognize in the Bryocorinae group; or defined in the Isometopinae and Orthotylinae groups.
- 1 Gon defined, with transverse ridges in the Bryocorinae group (67, 80-121); or undefined with sclerotized ridges (72, 73, 77, 78); or wholly reduced (54-58, 64, 65).
- 50) 0 Gon difficult to recognize in the Bryocorinae group; or defined; or defined with transverse ridges in the Isometopinae and Orthotylinae groups.
- 1 Gon undefined, with sclerotized ridges in the Bryocorinae group (72, 73, 77, 78); or wholly reduced (54-58, 64, 65).
- 51) 0 Gon difficult to recognize in the Bryocorinae group; or defined; or defined with transverse ridges; or undefined with sclerotized ridges in the Isometopinae and Orthotylinae groups.
- 1 Gon wholly reduced in the Bryocorinae group (54-58, 64, 65).

23. Sheath (sh)

The sheath being differentiated was judged to be apomorphic. The distribution of the sheath in the Miridae indicates that it is a branching transformation series.

- 52) 0 Sh undifferentiated in the Isometopinae group; or in the Orthotylinae and Bryocorinae groups.
- 1 Sh differentiated in the Isometopinae group (8, 9).
- 53) 0 Sh undifferentiated in the Orthotylinae group; or in the Isometopinae and

Bryocorinae groups.

- 1 Sh differentiated in the Orthotylinae group (14-17, 23, 25, 28, 29).

- 54) 0 Sh undifferentiated in the Bryocorinae group; or in the Isometopinae and Orthotylinae groups.

- 1 Sh differentiated in the Bryocorinae group (76, 87-103, 108-113, 118, 119, 121).

24. Aedeagus (aed)

The moderate-length aedeagus was judged to be plesiomorphic. The lengthened, shortened, and wholly reduced aedeagus were judged to be apomorphic. The distribution of the modification of the aedeagus between subfamilies indicates that it is a branching transformation series.

- 55) 0 Aed moderately long in the Isometopinae group; or shortened; or wholly reduced in the Orthotylinae and Bryocorinae groups.
- 1 Aed lengthened in the Isometopinae group (7).
- 56) 0 Aed moderately long in the Isometopinae group; or lengthened in the Orthotylinae and Bryocorinae groups.
- 1 Aed shortened in the Isometopinae group (8, 9); or wholly reduced (10-13).
- 57) 0 Aed moderately long in the Isometopinae group; or lengthened; or shortened in the Orthotylinae and Bryocorinae groups.
- 1 Aed wholly reduced in the Isometopinae group (10-13).
- 58) 0 Aed moderately long in the Orthotylinae group; or shortened; or wholly reduced in the Isometopinae and Bryocorinae groups.
- 1 Aed lengthened in the Orthotylinae group (14, 21, 30-51).
- 59) 0 Aed moderately long in the Orthotylinae group; or lengthened in the Isometopinae and Bryocorinae groups.
- 1 Aed shortened in the Orthotylinae group (15, 16, 22-29); or wholly reduced (17-19).
- 60) 0 Aed moderately long in the Orthotylinae group; or lengthened; or shortened in the Isometopinae and Bryocorinae groups.
- 1 Aed wholly reduced (17-19).
- 61) 0 Aed moderately long in the Bryocorinae group; or shortened; or wholly reduced in the Isometopinae and Orthotylinae groups.
- 1 Aed lengthened in the Bryocorinae group (59, 60, 68-71).
- 62) 0 Aed moderately long in the Bryocorinae group; or lengthened in the Isometopinae and Orthotylinae groups;

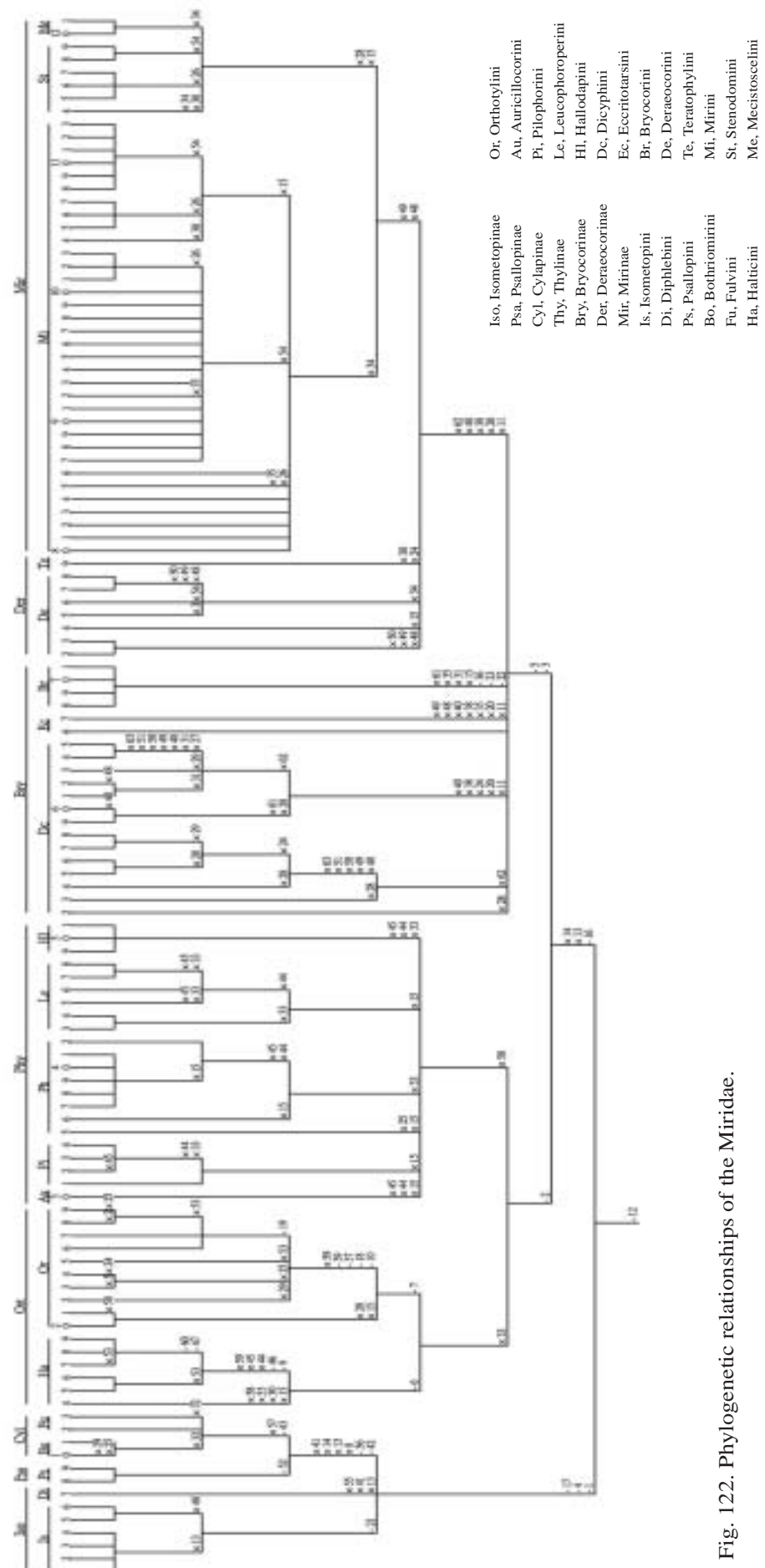


Fig. 122. Phylogenetic relationships of the Miridae.

- 1 Aed shortened in the Bryocorinae group (53, 61-63, 72-121); or wholly reduced (54-58, 64, 65).
- 63) 0 Aed moderately long in the Bryocorinae group; or lengthened; or shortened in the Isometopinae and Orthotylinae groups.
- 1 Aed wholly reduced in the Bryocorinae group (54-58, 64, 65).

Relationship analysis

Character 12 exhibited by all examined species was determined to be a synapomorphy of the Miridae.

The combination of characters 1, 4, 17, and 16 exhibited by the largest number of taxa was selected to be the basal branch. Herein, the Isometopinae, Psallopinae, and Cylapinae were determined to be the subfamily, the Isometopinae group, because they possess the synapomorphy, i.e., character 17; by special judgment, i.e., character 1; and from paraphyletic and ex-group relationships, i.e., character 4. The Orthotylinae, Phylinae, Bryocorinae, Deraeocorinae, and Mirinae were determined to be a subfamily group because they possess the synapomorphy, i.e., character 16.

Character 2 and the combination of characters 3 and 5 exhibited by the second-largest number of taxa was selected to be the second branch. Herein, the Orthotylinae and Phylinae were determined to be the subfamily, the Orthotylinae group, because they possess a special judgment, i.e., character 2. The Bryocorinae, Deraeocorinae, and Mirinae were determined to be the subfamily, the Bryocorinae group, because they possess character 3 of special judgment, and character 5 of the paraphyletic and ex-group relationships.

Characters 6 and 7 of special judgment seemingly indicate that the Orthotylinae is not a monophyletic taxon.

Finally other characters are added.

DISCUSSION

Singh-Pruthi (1925; 136) stated that the "Ejaculatory reservoir (ejr) is an expansion of the ejaculatory duct at the base of the vesica, present in Heteroptera." According to this definition, we judged the ejaculatory reservoir to be present in the Miridae. But Singh-Pruthi (1925: 176) remarked that "The ejaculatory reservoir invariably present in Pentatomidae etc., and absent

in Tingidae and Reduviidae, is absent in Capsidae (=Miridae) as well." Here, he did not tell us why an expansion of the ejaculatory duct at the base of vesica in the Miridae was not the ejaculatory reservoir. Recently Tsai *et al.* (2004) redefined the ejaculatory reservoir as "a structure protruding from the dorsobasal portion of the expanded ejaculatory duct at the middle of the aedeagus. The part of the structure outside the base of the aedeagus is the ejaculatory reservoir and the other part within the aedeagus, plus the expanded ejaculatory duct, is the reservoir lumen." Based on this definition, we accept Singh-Pruthi's judgment: "The ejaculatory reservoir is absent in Capsidae as well." The expanded ejaculatory duct and the ejaculatory reservoir are quite different structures, and there are four differences between them: 1) the position (an evolutionary event) between the apex of the support tube and the base of the aedeagus versus within the middle of the aedeagus; 2) the nature of the structure as an expansion of the ejaculatory duct versus protruding from the expanded ejaculatory duct within the middle of the aedeagus; 3) the apical portion always being spiraled versus never being spiraled; and 4) being present in the Miridae only versus in the Pentatomomorpha only.

Singh-Pruthi (1925: 171) described for *Calocoris norvegicus* that "The ejaculatory duct just after entering the basal foramen very much swollen, probably owing to the fusion with it of the basal plates ridge (=support tube) in that region." Based on our observation that only the expanded ejaculatory duct was modified, then the support tube did not participate in this matter. Singh-Pruthi (1925), Kelton (1959), and Kerzhner and Konstantinov (1999, 2003) paid little attention to the expanded ejaculatory duct, especially the second author; the main purpose of this investigation was to determine what occurred to this structure. From our observations, we judged that the expanded ejaculatory duct is a synapomorphy of the family Miridae including the subfamily Isometopinae. The evolutionary event occurred in an ancestor of the Miridae.

It was surprising that there were so many different structural modifications of the external male genitalia within the Miridae as compared to other Heteroptera.

- 1) The process(es) of abdominal segment IX was not mentioned by Singh-Pruthi (1925?) or Kelton and Konstantinov (1999, 2003). It was not a useful character in this investigation but

it is believed that it may be useful at the generic or specific level.

- 2) Abdominal segment X being elongate in lateral view was not mentioned by Singh-Pruthi (1925) or Kelton and Konstantinov (1999, 2003).
- 3) Abdominal segment XI being situated below abdominal tergite IX was not mentioned by Singh-Pruthi (1925) or Kelton and Konstantinov (1999, 2003).
- 4) The connective with a reduced transverse portion was not mentioned by Singh-Pruthi (1925) or Kelton and Konstantinov (1999, 2003).
- 5) The support bridge was distinguished by Yang and Chang (2000), and here we followed them. This structure was not distinguished by Singh-Pruthi (1925) or Kelton and Konstantinov (1999, 2003), probably because it has not been carefully examined throughout the Heteroptera.
- 6) The support ring is a new structure differentiated within the Miridae. We do not know the details yet. It probably differentiated from the apex of the support tube, being a tube-shaped structure in *Psallops* spp. and ring-like in others. This is the reason we did not use this character.
- 7) The shortened phallobase was not mentioned by Singh-Pruthi (1925) or Kelton and Konstantinov (1999, 2003).
- 8) The shortened phallobasal conjunctiva was not mentioned by Singh-Pruthi (1925) or Kelton and Konstantinov (1999, 2003).
- 9) The exposed phallobasal conjunctiva was judged to be the bulbous vesica (= aedeagus) by Singh-Pruthi (1925). His interpretation was followed by Kelton and Konstantinov (1999, 2003).
- 10) The phallobasal conjunctiva processes being exposed in the genital chamber is a new differentiated character within the Miridae, and not mentioned by Singh-Pruthi (1925) or Kelton and Konstantinov (1999, 2003).
- 11) The expanded ejaculatory duct between the apex of the support tube and the base of the aedeagus did not attract the attention of Singh-Pruthi (1925) or Kelton and Konstantinov (1999, 2003).
- 12) The sheath was judged by Konstantinov (2003: 31) to be "Ductus seminis (= ejaculatory duct) with strongly sclerotized distal (= sheath) and basal (= basal part of expanded ejaculatory duct) parts in *Psallops*."

This structure appeared only within the Miridae in the Heteroptera and in most Fulgoroidea.

- 13) The aedeagus was either moderately long, lengthened, shortened, or wholly reduced. Singh-Pruthi (1925) judged the inner structure (= aedeagus) of his bulbous vesica to be the ejaculatory duct, and a wholly reduced one to be an undifferentiated endosoma. These judgments made it difficult to compare one with the others. Singh-Pruthi's view was followed by Kelton and Konstantinov.

The following phylogenetic relationships in the Miridae is proposed: (Isometopinae + (Psallopinae + Cylapinae)) + ((Orthotylinae + Phylinae) + (Bryocorinae + (Deraeocorinae + Mirinae))). At first, based on the exposed phallobasal conjunctiva in the Bryocorinae, Deraeocorinae, and Mirinae, we agreed with the paraphyletic and ex-group relationships. The Bryocorinae is paraphyletic, and the Deraeocorinae and Mirinae are ex-groups. Then we found that based on the same character, the Isometopinae, Psallopinae, and Cylapinae have the same relationships. The Isometopinae is paraphyletic, and the Psallopinae and Cylapinae are the ex-groups. Of course, it is not a synapomorphy. Furthermore, if the lengthened aedeagus is considered, the Orthotylinae and Phylinae are paraphyletic and also have ex-group relationships. The Orthotylinae is paraphyletic, and the Phylinae is an ex-group. We did not select this third one. We clearly know that the above character is not recognized in a cladistic classification; for evolutionary taxonomists, however, this is not rejected.

The other debatable character we selected was the evolutionary line. We found as mentioned in character analysis 1 the special judgment in the subfamily. There were four similar transformation series distributed in three subfamily-group, i.e., the Isometopinae, Orthotylinae, and Bryocorinae groups, respectively. What indicated these characters? It impressed us that lately there were three evolutionary lines in the Miridae. This character could not be recognized in a cladistic classification, but we do not know the reflections of evolutionary taxonomists. The second author considered this character to have a high weight.

The Orthotylinae and Phylinae were a difficult problem for us. We found, as mentioned in character analysis 3, by special judgment that the exposed phallobasal conjunctiva within the

Orthotylineae, Halticini, and Orthotylini is distinctly heterogeneous. Herein we could do nothing. It is our hope that a Miridae specialist considers our data and answers the following questions: 1) Are the Halticini and Orthotylini a monophyletic subfamily or two distinct subfamilies? 2) What are the true relationships among the Halticini, Orthotylini, Phylinae (excluding the Pilophorini), and Pilophorini.

To compare our proposition with Schuh's (1976: 12; Fig. 6) "the Isometopinae + (Psallopinae + (Phylinae including the Orthotylineae + (Cylapinae + ((Mirini + Deraeocorini) + Bryocorinae)))))." If (Mirini + Deraeocorini) + Bryocorinae can be interpreted as Bryocorinae + (Deraeocorinae + Mirinae), then our proposition is congruous with that of Schuh, except the Isometopinae is not the sister group of all other groups and the Isometopinae, Psallopinae, and Cylapinae form the Isometopinae group.

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